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ANNUAL REPORTS, WAR DEPARTMENT
FISCAL YEAR ENDED JUNE 30, 1910

REPORT OF THE

CHIEF OF ENGINEERS U. S. ARMY

1910

IN THREE PARTS

PART III

WASHINGTON
GOVERNMENT PRINTING OFFICE
1910

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APPENDIXES

TO THE

REPORT OF THE CHIEF OF ENGINEERS,

UNITED STATES ARMY

(CONTINUED).

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APPENDIX R R.

IMPROVEMENTS OF RIVERS AND HARBORS IN THE LOS ANGELES, CALIFORNIA, DISTRICT.

REPORT OF LIEUT. CHAS. T. LEEDS, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1910.

IMPROVEMENTS.

1. San Diego Harbor, California.
2. Deep-water harbor at San Pedro Bay, California.
3. Wilmington Harbor, California.
4. Los Angeles Harbor, California.
5. San Luis Obispo Harbor, California.

UNITED STATES ENGINEER OFFICE,
Los Angeles, Cal., July 15, 1910.

SIR: I have the honor to forward herewith annual report on works of river and harbor improvement in my charge for the fiscal year ending June 30, 1910.

Very respectfully, your obedient servant,

CHAS. T. LEEDS,
First Lieut., Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

RR 1.

IMPROVEMENT OF SAN DIEGO HARBOR, CALIFORNIA.

With an allotment of $30,000 from appropriation made by river and harbor act of March 3, 1909, 100,904 cubic yards of material, at $0.2874 per yard, was dredged in the channel through the outer bar under contract with the California Reclamation Company dated July 6, 1909. Work began November 29, 1909, and was completed January 17, 1910. A channel 200 feet wide and 29 to 30 feet deep was dredged through the bar.

The river and harbor act of June 25, 1910, has appropriated $125,000 for deepening and widening the channel through the outer bar and the middle ground just within the harbor.

APPROPRIATIONS.

Previous to December 31, 1902	$432,500.00
March 3, 1903	192,850.00
March 3, 1905	10,000.00
March 2, 1907	20,000.00
March 3, 1909	30,000.00
June 25, 1910	125,000.00
Repayment	3.26
Total	810,353.26

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CONTRACTS IN FORCE.

CONTRACT FOR DREDGING ON OUTER BAR.

Name of contractor: California Reclamation Company.
Contract entered into July 6, 1909; approved July 31, 1909.
Work to begin October 4, 1909; contract to be completed August 7, 1910.
Work was completed January 17, 1910.
One hundred thousand nine hundred and four cubic yards of material was dredged, at $0.2874 per yard.

COMMERCIAL STATISTICS.

[Furnished by the collector of customs at San Diego, Cal.]

Vessel classification.

Class.	American.	Foreign.	Total.	Net registered tonnage.	Passengers.
Registered:					
Steamers	581	28	609	409,662	1,102
Sailing	35	7	42	17,339	
Unregistered, rafts	3		3		
Total	619	35	654	427,001	1,102

Freight traffic.

Articles.	Amount, in customary units.	Amount, in short tons.	Valuation.
Merchandise, general	86,907 tons	86,907	$17,381,400
Coal	21,120 tons	21,120	87,409
Cement	37,395 barrels	7,479	84,138
Onyx	1,056 tons	1,056	132,100
Crude oil	290,875 barrels	48,479	203,812
Coke	3,207 tons	3,207	11,195
Fertilizer	2,094 tons	2,094	55,148
Pig iron	4,212 tons	4,212	57,528
Ores	5 tons	5	1,000
Lumber	52,600,000 feet b. m.	91,392	1,052,000
Total		265,951	19,065,730

RR 2.

DEEP-WATER HARBOR AT SAN PEDRO BAY, CALIFORNIA.

The construction of the breakwater was continued during the year, under continuing contract dated June 7, 1900, with the California Construction Company, of San Francisco, Cal.

At the beginning of the fiscal year 2,204,909 tons of stone had been deposited in the substructure, which had been raised to mean lower low water and was about completed for the length of 9,174 feet from its westerly end, and 222,038 tons had been placed in the superstructure. The amount of superstructure work done was the equivalent of 8,458 feet of completed wall.

During the fiscal year ending June 30, 1910, 25,993 tons of granite was placed in the substructure, at a cost of $0.844 per ton, and 7,233

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tons of granite in the superstructure, at a cost of $3.10 per ton, and 1,034 tons of granite was placed as a berm at the toe of the ocean slope of the superstructure, at a cost of $2 per ton. A concrete block 40 feet square and 20 feet high, beginning 3 feet below low water, was built at the outer end of the breakwater, at a cost of $6,930. The stubstructure was completed. The superstructure was about 99 per cent completed.

Further work is provided for under appropriation for improving Los Angeles Harbor.

APPROPRIATIONS.

June 3, 1896	$50,000.00	June 30, 1906	$290,000.00
July 1, 1898	400,000.00	March 4, 1907	92,915.00
March 3, 1899	200,000.00	March 4, 1909	100,000.00
March 3, 1901	146,000.00		2,900,000.00
June 28, 1902	311,085.00	Receipts from sales	.05
March 3, 1903	500,000.00		
April 28, 1904	350,000.00	Total	2,900,000.05
March 3, 1905	460,000.00		

CONTRACT IN FORCE.

CONTRACT FOR CONSTRUCTION OF BREAKWATER.

Name of contactor: California Construction Company.
Contract entered into June 7, 1900; approved June 27, 1900.
Work to begin August 4, 1900; contract to be completed March 31, 1907.
Contract extended for reasonable period.

Rates:		
For substructure stone, per ton of 2,240 pounds		$0.844
For superstructure stone, per ton of 2,240 pounds		3.10
For concrete, per cubic yard		6.00
Quantities (estimated):		
Stone in substructure	tons	2,210,958
Stone in superstructure	do	242,400
Total	do	2,453,358
Concrete	cubic yards	2,370

Total consideration of contract (approximate), $2,648,046.05.

SUPPLEMENTAL CONTRACT.

Name of contactor: California Construction Company.
Contract entered into November 24, 1909; approved June 11, 1910.
Provides for the extension of the stone superstructure to the westerly end of the breakwater in lieu of the construction of concrete block.

COMMERCIAL STATISTICS FOR YEAR ENDING DECEMBER 31, 1909.

For commercial statistics, see report of Wilmington Harbor, California.

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RR 3.

IMPROVEMENT OF WILMINGTON HARBOR, CALIFORNIA.

Dredging with government dredge.—The dredge *San Pedro* was employed during most of the year in dredging in the turning basin. This work was completed June 25, 1910, when the dredge was moved to the Crescent wharf, and dredged out a lump which had caved from the side slope under the wharf. On June 27 the dredge was moved to a point in the entrance channel near Deadmans Island, where it was in operation at the close of the fiscal year. All dredging was carried to a depth of 25.5 feet below mean lower low water. A total of 885,298 cubic yards was dredged from 7,051 linear feet of cut approximately 200 feet wide, and varying from 5 to 29 feet in depth. This material was wasted as follows:

	Cubic yards.
Pumped 995 to 2,383 feet and wasted on Smiths Island and tide lands north and west of the island	557,141
Pumped 1,830 to 2,556 feet and wasted on San Pedro, Los Angeles and Salt Lake Railroad Company's concession south of Terminal bath house	50,000
Pumped 1,575 to 2,408 feet and wasted into ocean opposite station 147	264,880
Pumped 521 feet and wasted against bulkhead opposite station 121	2,166
Pumped 680 feet and wasted over jetty north of Deadmans Island opposite station 56½	11,111
Total	885,298

The material removed from the turning basin consisted of quicksand, hardpan, shell, and blue clay; the hardpan, principally on the east side, was 5 to 7 feet thick, and in the bottom cut. A large percentage of disintegrated shell was found all over the basin and was particularly hard to handle, as it persistently clogged the discharge pipe. The material encountered near Deadmans Island was quicksand, some shell, and a large percentage of bowlders from 5 to 100 pounds in weight.

The following statement shows the distribution of time for the dredge during the year:

	H.	M.
Moving and placing plant	343	45
Actual pumping	5,393	45
Repairs	746	50
Time lost passing vessels	6	15
Cleaning suction	67	30
Advancing	625	30
Not working (52 Sundays and 13 holidays, etc.)	1,576	25
Total	8,760	00

The following statement shows the cost of dredging during the year:

Superintendence and office work	$2,704.79
Care of plant, labor	1,080.00
Surveys, labor	184.00
Towage and dispatch work, labor, supplies, and hire of launch	1,090.94
Alterations and repairs to dredge and attendant plant, labor, and supplies	6,893.50
Operating dredge, superintendence, labor charges, fuel, fresh water, lubricants, and other supplies	46,649.02
Deterioration of plant and property during fiscal year	10,757.77
Total cost of dredging	69,360.02
Amount of material removed—cubic yards	885,298
Cost per cubic yard	$0.078

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Considering the actual pumping time for the entire year the solids amounted to about 4.7 per cent of the total flow through the discharge pipe.

Miscellaneous work.—During the year 747 hours were spent in making repairs to dredge incident to the work. The principal items were as follows: The "A" frame was renewed; reenforce pieces were bolted on gallows frame over pilot house, where dry rot had set in. Twice during the year the boilers were cleaned and overhauled and fire walls renewed; the main engine was overhauled and the main pump completely relined; the runners for main pump and cutter cages were repaired; cylinders of cutter engine were rebored and new packing rings put in; the hot well was renewed, as the old one was leaky and beyond repair; all auxiliary machinery and steam pipes were thoroughly overhauled; the ladder was scraped, painted, and a crack in one of the side "I" bars repaired; the suction pipe in hold was replaced and that on the ladder turned; the discharge pipe in the hold was turned, a new discharge throat piece put in at main pump, and a new riser and tailpiece at stern of dredge; one spud, badly worn and cracked, was replaced. All of these repairs were made at a cost of $6,893.50, and, with the exception of a small amount of boiler work, were performed by the dredge crew, with the aid of the machine shop aboard the dredge.

The launch *Pedrito* was overhauled and repaired at a cost of $54.81.

Further work on this harbor has been provided for by appropriation under the name of Los Angeles Harbor.

APPROPRIATIONS.

Previous to adoption of present project	$1,005,000.00
June 13, 1902	250,000.00
March 3, 1905	100,000.00
June 30, 1906	100,000.00
March 2, 1907	113,000.00
March 4, 1907	50,000.00
March 3, 1909	20,000.00
Total	1,638,000.00
Receipts from sales and for injuries to dredge	132.50
Aggregate	1,638,132.50

CONTRACT IN FORCE.

CONTRACT FOR FURNISHING CRUDE OIL.

Name of contractor: H. S. Botsford.
Contract entered into July 6, 1909; approved August 11, 1909.
Deliveries to begin July 1, 1909.
Contract completed June 30, 1910.
Twenty thousand barrels of oil for fuel for dredge, at $1 per barrel.

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COMMERCIAL STATISTICS.

[Furnished by the collector of customs at Los Angeles, Cal.]

Vessel classification.

Class.	American.	Foreign.	Total.	Net registered tonnage.	Passengers.
Registered:					
Steamers	1,966	30	1,996	1,365,771	228,632
Sailing	165	2	167	67,321	
Total	2,131	32	2,163	1,433,092	228,632

Freight traffic.

Article.	Amount, in customary units.	Amount, in short tons.	Valuation.
Merchandise, general	174,120 tons	174,120	$32,152,850
Iron and steel	4,062 tons	4,062	57,045
Cabinet wood in logs	1,710,000 feet b. m.	3,420	25,127
Crude oil	874,400 barrels	145,734	874,400
Lumber	564,651,600 feet b. m.	1,098,616	11,293,032
Total		1,425,952	44,402,454

RR 4.

IMPROVEMENT OF LOS ANGELES HARBOR, CALIFORNIA.

For work done during the year see reports on deep-water harbor at San Pedro Bay, California, and improvement of Wilmington Harbor, California. Those two harbors now being within the limits of the city of Los Angeles by the consolidation of the cities of San Pedro, Wilmington, and Los Angeles, appropriations for their improvement were made in the river and harbor act of June 25, 1910, under the name of Los Angeles Harbor.

Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912, for works of improvement ..... [a] $316,800
Submitted in compliance with requirements of sundry civil act of June 4, 1897.

APPROPRIATIONS.

June 25, 1910 ..... $578,000

CONTRACTS IN FORCE.

See reports for deep-water harbor at San Pedro Bay, California, and improvement of Wilmington Harbor, California.

[a] Exclusive of the balance unexpended July 1, 1910.

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COMMERCIAL STATISTICS.

For commercial statistics, see report on Wilmington Harbor, California.

RR 5.

IMPROVEMENT OF SAN LUIS OBISPO HARBOR, CALIFORNIA.

No work was done during the year. On account of the shallow water around the Morro Rock quarry it has been impossible to load a lighter at the quarry; the contractor was therefore authorized by the department to delay the work during the working season of 1909. As these channels had not improved at the time work should have begun, in May, 1910, department authority was obtained June 3, 1910, by the contractor to close the channel north of Morro Rock quarry, in whole or in part, as may be necessary, in order to scour the south channel to a sufficient depth to permit lighters to reach the quarry. This work was in progress at the close of the fiscal year.

Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912, for works of improvement ..... [a] $110,000
Submitted in compliance with requirements of sundry civil act of June 4, 1897.

APPROPRIATIONS.

August 11, 1888	$25,000.00	March 2, 1907	$63,660.00
September 19, 1890	40,000.00	May 27, 1908	60,000.00
July 13, 1892	30,000.00	March 4, 1909	30,000.00
August 18, 1894	40,000.00		
June 3, 1896	40,000.00	Total	458,660.00
March 3, 1899	55,000.00	Receipts from sales	.95
June 13, 1902	50,000.00		
March 3, 1905	25,000.00	Aggregate	458,660.95

CONTRACT IN FORCE.

CONTRACT FOR COMPLETING BREAKWATER.

Name of contractor: San Francisco Bridge Company.
Contract entered into July 16, 1907; approved August 15, 1907.
Work to begin May 1, 1908.
Contract to be completed: Indefinite, depending upon appropriations by Congress.
Contract for delivering in breakwater 151,140 tons of stone, at $1.57 per ton.

[a] Exclusive of the balance unexpended July 1, 1910.

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COMMERCIAL STATISTICS.

[Furnished by the Pacific Coast Railway Company.]

Vessel classification.

Class.	American.	Foreign.	Total.	Net registered tonnage.
Registered:				
Steamers	282	.....	282	256,620
Sailing	62	.....	62	68,572
Unregistered: Steamers	.....	5	5	18,476
Total	344	5	349	343,668

Freight traffic.

Article.	Amount in customary units.	Amount in short tons.	Valuation.
Merchandise, general	9,597 tons	9,597	$1,919,400
Coal	97 tons	97	1,164
Lumber	9,591,979 feet b. m	17,318	172,655
Grain	9,620 tons	9,620	192,400
Bituminous rock	1,242 tons	1,242	6,210
Crude oil	6,033,357 barrels	1,005,559	4,826,685
Total	.....	1,043,433	7,118,514

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APPENDIX S S.

IMPROVEMENT OF RIVERS AND HARBORS IN THE FIRST SAN FRANCISCO, CALIFORNIA, DISTRICT.

REPORT OF LIEUT. COL. JOHN BIDDLE, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1910.

IMPROVEMENTS.

1. Harbor at San Francisco, California.
2. Redwood Creek, California.
3. Oakland Harbor, California.
4. San Pablo Bay, California.
5. Suisun Channel, California.
6. San Joaquin River, California.
7. Stockton and Mormon channels, California.
8. Mokelumne River, California.
9. Petaluma Creek and Napa River, California.
10. Humboldt Harbor and Bay, California.

UNITED STATES ENGINEER OFFICE,
San Francisco, Cal., July 10, 1910.

SIR: I have the honor to transmit herewith the annual report of river and harbor works under my charge for the fiscal year ending June 30, 1910.

Very respectfully,

JOHN BIDDLE,
Lieut. Col., Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

S S 1.

IMPROVEMENT OF HARBOR AT SAN FRANCISCO, CALIFORNIA.

No work was done during the year, and no money has been expended.

There has been no deterioration at any time on any part of the improvement at this locality. All works of improvement have been permanent and will remain so.

Estimate of additional funds required.

Amount required for expenidture in fiscal year ending June 30, 1912, for works of improvement ..... [a]$30,000
Submitted in compliance with requirements of sundry civil act of June 4, 1897.

[a] Exclusive of the balance unexpended July 1, 1910.

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APPROPRIATIONS.

Total of appropriations to December 31, 1902..... [a] $485,927.84

COMMERCIAL STATISTICS.

Vessel classification.

Owing to the late date at which instructions were received in regard to furnishing data as to vessel classification, it has been impossible to collect exact information, but from an examination of the vessel register at the Merchants' Exchange, it is apparent that about nine-tenths of the vessels engaged in this commerce are of American register.

Freight traffic.

Article.	Amount, in short tons.	Article.	Amount, in short tons.
Flour	110,476	Lemons and oranges	12,789
Wheat	166,215	Apples	10,699
Barley	275,257	Sugar	276,567
Oats	26,839	Coffee	10,992
Beans	391,027	Rice	25,456
Bran	13,803	Shooks	18,941
Potatoes	101,946	Asphaltum	30,071
Onions	18,563	Cement	10,955
Hay	178,998	Nitrate	40,361
Wool	15,806	Pig iron	9,049
Lime	35,518	Coal	408,881
Paper	31,513	Coke	91,871
Wine	72,444	Matting	10,856
Lumber	1,510,051	Tea	11,197
Railroad ties	40,391	Silk	2,386
Cotton	16,219	Tin bricks	8,288
Oil	395,778	Sulphur	9,068
Salmon	92,801	Fertilizer	18,650
Canned goods	51,575	Miscellaneous	170,159
Raisins	21,375		
Dried fruit	33,854	Total	4,784,835
Eggs	10,150		

It was impossible in the limited time allowed to obtain any exact detailed data as to valuation. To obtain such data for this port would be a heavy task. The San Francisco Chamber of Commerce gives the total valuation of this commerce as $82,569,332.

SS 2.

IMPROVEMENT OF REDWOOD CREEK, CALIFORNIA.

No work was done during the year in this locality and no funds were expended.

A preliminary examination and survey were made during the year and report thereon submitted (see H. Doc. No. 307, 61st Cong., 2d sess.).

The deterioration in the works of improvement at this locality has been the deposit of detritus during freshets. This has been allowed to accumulate in this stream for several years and now amounts to an obliteration of a considerable portion of the work done by the Gov-

[a] Of this amount, $3,470.32 was turned into the Treasury.

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ernment. To repair these works is simply to maintain them, and the cost of maintenance is given in the money statement.

Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912, for maintenance of improvement	[a]$3,000

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

Total appropriations to December 31, 1902	[b]$31,800
June 25, 1910	12,000
Total	43,800

COMMERCIAL STATISTICS.

Vessel classification.

Class.	American.	Net registered tonnage.	Passengers.
Registered:			
Steamers	13	2,108	2,000
Sailing	18	1,698	.....
Unregistered barges, etc	6	363	.....
Total	37	4,169	2,000

Freight traffic.

Article.	Amount, in short tons.	Valuation.	Average haul or distance freight was carried.
			Miles.
Hides for tanning	3,172	$88,102	29
Tan bark	10,850	210,855	29
Crude oil	3,024	21,000	29
Crude salt	13,300	53,200	29
Codfish	1,400	196,000	29
Salt for curing fish	600	2,100	29
Lumber	6,000	168,000	29
Sand	930	1,500	29
Structural iron and fittings	550	14,500	29
Hay	950	6,600	29
Miscellaneous	4,007	37,120	29
Total	44,783	897,977	.....

It has been impossible in the limited time allowed to obtain data as to the rate per ton-mile for this stream.

[a] Exclusive of the balance unexpended July 1, 1910.
[b] Of this amount $357.34 was returned to the Treasury.

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SS 3.

IMPROVEMENT OF OAKLAND HARBOR, CALIFORNIA.

At the beginning of the year two dredging contracts were in force, one with the San Francisco Bridge Company for dredging about 2,000,000 cubic yards of material to obtain a channel 300 feet wide and 25 feet deep from Fallon street to the tidal basin, and a 300-foot channel 17 feet deep around both sides of the tidal basin. This contract was still in force at the close of the fiscal year. The price paid was 18.8 cents per cubic yard, place measurement, and the quantity of material removed under this contract during the fiscal year was 645,767 cubic yards. The total amount removed under this contract at the end of the fiscal year was 1,920,653 cubic yards, which is more than the original estimated amount of the contract. There remains about 56,000 cubic yards to complete work under the contract.

The other contract was with N. R. Harris, for widening the city front channel 100 feet on the north side, the depth remaining the same, namely, 25 feet at low water. The quantity of material removed under this contract during the fiscal year was 225,209 cubic yards. The contract was for a total of about 400,000 cubic yards, practically all hard pan. The price paid was 29.7 cents per cubic yard, place measurement.

During the year a third contract was entered into with Mervy-Elwell Company for repairing the High street highway bridge over the tidal canal, which was seriously damaged by fire on May 21, 1909. Under this contract 34,000 pounds of steel work was put in place at a cost of 17.4 cents per pound, 119,373 feet b. m. of lumber was placed at a cost of $24 per 1,000, and 5 creosoted piles were placed at a cost of $25 each. The total cost of the work was $8,905.95.

For explanation for the increase of $500,000 in carrying out the project for improving Oakland Harbor, see Annual Report of the Chief of Engineers for 1909, pages 2186–2187.

In the last annual report it was recommended that the three bridges over the Tidal Canal connecting San Leandro Bay with Oakland Harbor be turned over to the local authorities for operation and maintenance. (See pp. 2187–2188, Report of Chief of Engineers, 1909.) It was proposed then that the Park street bridge be equipped for operation by electricity, and the other two by hand power. The estimated cost of this work was given as $4,500. Since then the county, through its board of supervisors, has agreed to take over these bridges and to maintain and operate them as drawbridges. It was urged by the local authorities that all three bridges should be operated by electricity as the hand-power method would be too slow. The county agreed to furnish the electric power. In a special report in December, 1909, it was recommended that the necessary installation be made for operation of all bridges by electricity. The cost of this installation was estimated at $17,150.

The act of June 25, 1910, provides for turning these bridges over to the local authorities, and authorizes the expenditure of the amount necessary for alterations and repairs in connection with the transfer.

The deterioration in the government works at this locality consists mainly of a slight shoaling in the main ship channel and in the Tidal

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Canal, and natural deterioration of the three bridges. The channel will be deepened in the near future under a new project, and any shoaling therein will be removed. An estimate for necessary repairs to the bridges is given in the text (p. 2350), and includes cost of installing electrical machinery with a view to operating the draws of the bridges. The wooden flooring on the bridges has to be renewed and the bridges have to be repainted about every three years. The cost thereof averages about $2,200 per annum. The bridges are to be turned over to the local authorities for operation as draws, maintenance and repairs, so that there will be no further charge to the Government on their account.

Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912, for works of improvement:
New project ..... [a]$150,000
Submitted in compliance with requirements of sundry civil act of June 4, 1897.

APPROPRIATIONS.

Total of appropriations to December 31, 1902	[b]$2,550,600.00	March 4, 1909	$256,000.00
March 3, 1903	131,000.00	Received by reimbursement from Isthmian Canal Commission	14.21
April 28, 1904	19,000.00	Received from sale of typewriter	5.00
March 3, 1905	100,000.00	June 25, 1910	250,000.00
June 30, 1906	81,000.00	Total	3,683,822.21
March 2, 1907	68,203.00		
March 4, 1907	23,000.00		
May 27, 1908	190,000.00		
March 3, 1909	15,000.00		

CONTRACTS IN FORCE.

Contract dated May 4, 1908, for dredging about 1,916,700 cubic yards of material from Oakland Harbor, California.
Rate: 18.8 cents per cubic yard.
Name of contractor: San Francisco Bridge Company.
Date of commencement: May 23, 1908.
Date of completion: Work still in progress; will probably be completed about August 1, 1910.
Date of approval: May 29, 1908.
Date of expiration: December 6, 1910.

Contract dated February 13, 1909, for dredging about 400,000 cubic yards of material from Oakland Harbor, California.
Rate: 29.7 cents per cubic yard.
Name of contractor: N. R. Harris.
Date of commencement: March 5, 1909.
Date of completion: February 14, 1910.
Date of approval: February 26, 1909.
Date of expiration: March 5, 1910.

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[a] Exclusive of the balance unexpended July 1, 1910.
[b] See House Doc. No. 421, 57th Cong., 2d sess, page 236.

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Contract dated September 29, 1909, for repairing the bridge over the tidal canal at High street, Alameda, Cal.

Rate: 17.4 cents per pound for new steel members and for repairing all old members; $24 per thousand feet b. m. for new woodwork in place; $25 each for creosoted piles in place.

Name of contractor: Mervy-Elwell Company.
Date of commencement: October 25, 1909.
Date of expiration: January 19, 1910.
Date of approval: October 8, 1909.
Date of completion: January 18, 1910.

COMMERCIAL STATISTICS.

Vessel classification.

Class.	American.	Foreign.	Total.	Net registered tonnage.
Registered:				
Steamers	230	19	249	1,559,412
Sailing	[a] 494	6	[a] 500	88,463
Unregistered:				
Barges (trips)	[b] 530	.....	[b] 530	.....
Tugs (trips)	1,858	.....	1,858	.....
Yachts (trips)	136	.....	136	.....
Total	[a] 724 / [b] 2,524	25	[a] 749 / [b] 2,524	1,647,875

[a] Number of vessels. [b] Number of trips.

Freight traffic.

Article.	Amount, in short tons.	Valuation.
Coke, wood, coal, and oil	270,000	.....
Hay, grain, flour, etc	61,000	.....
Lumber	570,000	.....
Building materials	500,000	.....
Miscellaneous	115,664	.....
Total by merchant vessels	1,516,664	$84,933,184
Total carried by ferries	2,522,804	75,684,120
Grand total	4,039,468	160,617,304

S S 4.

IMPROVEMENT OF SAN PABLO BAY, CALIFORNIA.

No work was done during the year and no money was spent.

The deterioration at this locality consists of shoaling in the excavated channel to the extent of about one and one-half million cubic yards since the completion of the work in 1906. It is estimated that it would cost about $217,500 to restore this channel to its former depth and width. The locality is unquestionably worthy of further improvement, but further improvement along lines of the original project is not recommended because deterioration would follow so speedily and so extensively as to admit of no practical benefit from the expenditure. Attention is invited to report of June 8, 1908, of a joint army and navy board submitting a project for a channel

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through San Pablo Bay to Mare Island Navy-Yard 500 feet wide and 30 feet deep.

APPROPRIATIONS.

June 13, 1902	$100,000.00
March 3, 1903	200,000.00
June 30, 1906	53,168.41
Total	353,168.41

COMMERCIAL STATISTICS.

The commerce passing through San Pablo Bay includes all that coming to San Francisco from the Sacramento, San Joaquin, and Napa rivers and Petaluma Creek, which, being all carried on stern-wheel flat-bottom river steamers and barges, is not particularly benefited by the deep channel over the shoal. However, all the commerce of Karquines Straits and Port Costa, which is mostly carried on deep-sea ships, and all vessels going to and from Mare Island Navy-Yard are benefited by the dredged channel.

S S 5.

IMPROVEMENT OF SUISUN CHANNEL, CALIFORNIA.

No work has yet been done on this channel, and no money has been spent.

There has been no work of improvement at this locality, and consequently no deterioration of improvement.

Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912, for works of improvement ..... [a] $12,500
Submitted in compliance with requirements of sundry civil act of June 4, 1897.

LIST OF APPROPRIATIONS.

June 25, 1910	$12,500

COMMERCIAL STATISTICS.

VESSEL CLASSIFICATION.

It has been impossible, in the limited time allowed, to obtain any exact data as to the classification of the vessels using this channel.

[a] Exclusive of the balance unexpended July 1, 1910.

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Freight traffic.

Article.	Amount, in short tons.	Valuation.
Lumber	2,925	$57,500.00
Sand	600	420.00
Brick	75	400.00
Cream	250	25,000.00
Potatoes	500	7,500.00
Fuel oil	89,526	181,409.21
Hay	3,500	35,000.00
Barley	200	5,000.00
Total	97,576	312,229.21

It has been impossible as yet to obtain any definite data as to average length of haul or rate per ton-mile for this waterway.

SS 6.

IMPROVEMENT OF SAN JOAQUIN RIVER, CALIFORNIA.

At the beginning of the fiscal year there was not sufficient depth and width in Stockton channel to accommodate the necessary shipping in and out of Stockton. Contract was entered into on July 7, 1909, with the Standard American Dredging Company to dredge out this channel to a depth of 9 feet at low water and a bottom width of 150 feet, from the San Joaquin River to a point 1,000 feet above the Santa Fe wharf, a total distance of 8,000 feet. This work was completed September 16, 1909. A total of 165,830 cubic yards was removed at a cost of 10.74 cents per cubic yard. The width and depth required by approved project were thereby obtained in this channel. From a survey completed in May, 1910, it is estimated that to complete a channel in Stockton channel 200 feet wide and 9 feet deep at low water, as required by latest approved project, from the San Joaquin River to the head of navigation at Stockton, will require the removal of about 170,000 cubic yards. This survey was also extended to cover Mormon Slough, which has not been dredged out since 1900. To obtain a channel in Mormon Slough 75 feet wide and 4 feet deep at low water for a distance of 4,500 feet will require the removal of about 90,000 cubic yards. It is expected to enter into contract for doing this work early in the coming fiscal year.

It is expected that the annual dredging required for this channel will in the future be much less, as the diverting canal to carry the waters of Mormon Slough and its attended detritus into the Calaveras River will be completed in July, 1910.

In August, 1909, it was found that a large shoal had developed at the Williamson reach, just above Pierce Landing, on the San Joaquin River. A clam-shell dredge was leased on September 22, 1909, at $80 per day of twenty-two hours, and the shoal was removed in eight days and two hours, at a total cost of $647.27. This dredge, the *Plutus*, removed 10,000 cubic yards, making a channel 100 feet wide and 8 feet deep at low water over a length of about 900 feet.

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In February, 1910, a shoal in the San Joaquin River, near Rough and Ready Island, became such a menace to navigation that it was necessary to lease a clam-shell dredge to remove it. This lease was entered into February 14, 1910. The price paid was $135 per day of twenty-two hours. A portion of the work was completed March 12, 1910, at a total cost of $675 for five days' work. There were not sufficient funds available to do all the work that was necessary, so the county leased this dredge and continued it at work and completed the necessary work to remove the shoal. This dredge, the *Golden Gate*, removed 10,000 cubic yards for the Government and 5,000 cubic yards for the county, making a channel through the east draw of the county bridge at Rough and Ready Island 80 feet wide and 8 feet deep at low water over a cut 450 feet long.

The deterioration in the works of improvement in this river has been the deposit of detritus during the annual freshets. This has occurred principally in Stockton channel, leading from the river proper to the city of Stockton and considered as a part of this improvement. Shoaling in Stockton channel has heretofore required annual redredging, but since the drainage waters from the country to the east have been diverted temporarily into the Boggs tract, through the efforts of the city of Stockton, this condition has been greatly remedied, and upon the completion of the diverting canal early in July of this year it is hoped that some permanent relief will be obtained.

Maintenance affords all necesseary repairs, and the estimate of cost thereof is given in the money statement.

Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912, for maintenance of improvement ..... [a]$25,000

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

August 14, 1876	$20,000	March 3, 1899	$20,000
June 14, 1880	20,000	June 13, 1902	18,000
March 3, 1881	40,000	Allotted from act of April 28, 1904	35,170
August 2, 1882	40,000	March 3, 1905	20,000
July 5, 1884	20,000	March 2, 1907	30,000
August 5, 1886	18,750	March 3, 1909	20,000
August 11, 1888	25,000	June 25, 1910	75,000
September 19, 1890	75,000		
July 13, 1892	65,000		
August 18, 1894	50,000	Total	649,670
June 3, 1896	57,750		

[a] Exclusive of the balance unexpended July 1, 1910.

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CONTRACTS IN FORCE.

Contract dated July 7, 1909, for dredging about 180,000 cubic yards of material from Stockton channel, California.
Rate: 10.74 cents per cubic yard.
Name of contractor: Standard American Dredging Company.
Date of commencement: July 31, 1909.
Date of completion: September 16, 1909.
Date of approval: July 23, 1909.
Date of expiration: October 29, 1909.

Contract dated September 22, 1909, for lease of clam-shell dredge *Plutus* for dredging in San Joaquin River, California.
Rate: $80 per day of 22 hours.
Date of commencement: September 23, 1909.
Date of completion: October 2, 1909.
Date of approval: Emergency contract not approved by Chief of Engineers.
Date of expiration: October 22, 1909.

Contract dated February 14, 1910, for lease of clam-shell dredge *Golden Gate*, for dredging in San Joaquin River, California.
Rate: $135 per day of 22 hours.
Date of commencement: February 16, 1910.
Date of completion: February 23, 1910.
Date of approval: Emergency contract not approved by Chief of Engineers.
Date of expiration: March 15, 1910.

COMMERCIAL STATISTICS, 1909.

The commerce of San Joaquin River is large and important. Two companies run boats and barges regularly between San Francisco and Stockton, the head of navigation on the lower river, and a large number of schooners ply on the lower river, carrying the heavier freight.

The following is a statement of the commerce carried by the vessels of the steamboat lines, but it has been found impracticable to obtain an authentic statement of the freight carried by the schooners and launches which ply on the river, as they run irregularly and no account is kept of their business.

Season of navigation.—Opened January 1; closed December 31.

Vessel classification.

Class.	American.	Net registered tonnage.	Passengers.
Registered:			
Steamers	1,074	427,339	100,000
Sailing	110	5,336	.....
Barges	423	44,128	.....
Unregistered:			
Launches	27	.....	10,000
Sailing	8	.....	.....
Rafts	12	.....	.....
Total	1,654	476,803	110,000

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Freight traffic.

Article.	Amount, in customary units.	Amount, in short tons.	Valuation.	Average haul or distance freight was carried.	Rate per ton-mile.
				Miles.	*Cents.*
Mill stuffs		139,111	$6,455,550	100	1 7/10
Local grain		160,194	4,234,552	90	1 1/2
Hay		35,000	385,000	100	1 7/10
Cord wood	2,800 cords	4,200	22,400	50	1 7/10
Merchandise		145,000	8,700,000	90	1 1/2
Fruit and vegetables		134,444	6,049,980	100	1 7/10
Wheat		39,457	1,499,366	100	1 7/10
Tan bark	2,512 cords	1,884	52,752	100	1 7/10
Lumber	32,000,000 feet	56,000	768,000	100	1 7/10
Potatoes		29,327	439,900	75	1 1/2
Beans		16,000	1,040,000	50	1 1/2
Onions		10,000	200,000	100	1 7/10
Cattle	2,955 head	1,478	93,425	100	.....
Sheep	5,000 head	750	15,000	100	.....
Motor cars		1,100	1,320,000	100	.....
Total		773,945	$1,275,925	.....	.....

The development of new markets in southern California, Arizona, and New Mexico for some of the special products carried on this river has had considerable influence on waterway traffic, as the bulk of the potato, bean, onion, and asparagus shipments now go out by railroad instead of by the river.

While the statistics show a slight falling off in tonnage, there is shown a marked increase in the total valuation of this commerce.

S S 7.

IMPROVING STOCKTON AND MORMON CHANNELS, CALIFORNIA.

At the beginning of the fiscal year work was in progress on both sections of the canal running north and east of Stockton, and being constructed to divert the waters of Mormon Slough across the country east of Stockton and into the Calaveras River. The California Reclamation Company, contractor for the Calaveras section, completed work on October 5, 1909, having excavated 120,043 cubic yards during the fiscal year, and a total of 609,461 cubic yards under the contract, at a price of 11.97 cents per cubic yard.

The contractor on the canal section, the Standard American Dredging Company, was so far behind his contract requirements in regard to rate of progress that no payments could be made him for work being done. Consequently, on July 14, 1909, a supplemental contract was entered into whereby payments could be made from month to month, provided he maintained the required rate of progress. During the fiscal year 735,280 cubic yards were excavated at a cost of 15½ cents per cubic yard. In addition, there were built the Linden road highway bridge, at a cost of $1,753, and the Waterloo road highway bridge, at a cost of $1,429.

The Sanguinetti lane bridge, together with its approaches, over the diverting canal, was completed on August 18, 1909, at a cost of $1,935 for the bridge and 50 cents per cubic yard for 746 cubic yards of material placed in the approaches.

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Very little deterioration has taken place at this locality, as all the works have been but recently constructed. The bridges built across the diverting canal during the last year have been subject to traffic wear and the influences of the elements, but it will not be practicable to estimate for repairs until they have been longer in use. The canal has not yet been completed and there has been no deterioration except of a very minor nature at the lower end.

This improvement is considered worthy of maintenance to divert the waters of Mormon Slough away from Stockton channel and save the expensive annual dredging found necessary in past years. It will not be used for navigation. The balance remaining after completion of the project will be sufficient for all needs for maintenance for some time to come.

APPROPRIATIONS.

June 13, 1902	$50,000	March 4, 1909	$56,079
March 3, 1903	30,000		
April 28, 1904	25,000	Total	280,395
March 3, 1905	49,316		

CONTRACTS IN FORCE.

Contract dated August 15, 1908, for excavating 572,100 cubic yards of material and building embankments at 11.97 cents per cubic yard, and changing two bridges at $1,520 each and extending one bridge at $1,000.
Name of contractor: California Reclamation Company.
Date of commencement: November 3, 1908.
Date of completion: October 5, 1909.
Date of approval: August 24, 1908.
Date of expiration: About October 15, 1909.

Contract dated August 15, 1908, for excavating 834,100 cubic yards of material and building embankments and dam at 15.5 cents per cubic yard, and building bridges at $1,623, $1,753, $1,493, $1,429, and $5,500 each.
Name of contractor: Standard American Dredging Company.
Date of commencement: November 3, 1908.
Date of completion: Work still in progress.
Date of approval: August 24, 1908.
Date of expiration: March 18, 1910, under supplemental agreement.

Contract dated June 21, 1909, for building a highway bridge over the diverting canal, east of Stockton, Cal., for the sum of $1,935, and grading the approaches to said bridge for 50 cents per cubic yard.
Name of contractor: Mervy-Elwell Company.
Date of commencement: July 17, 1909.
Date of completion: August 18, 1909.
Date of approval: Emergency contract, not approved.
Date of expiration: August 27, 1909.

SS 8.

IMPROVEMENT OF MOKELUMNE RIVER, CALIFORNIA.

During March and April, 1910, the river was meandered and sounded from the Galt-New Hope bridge to a point 2⅛ miles below New Hope Landing on the North Fork, and to a point 1 mile below

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New Hope Landing on the South Fork. This survey showed that there was a channel varying in width from 75 feet at the upper end to about 300 feet at the lower end on the North Fork, and about 200 feet at the lower end on the South Fork, with depths varying from 4 feet to 20 feet, but with two or three shoal places in the upper portions of the river where the maximum depth of water was only about 3 feet.

The total cost of this survey was $578.30.

On June 9, 1910, a clam-shell dredge was leased from N. R. Harris at a rate of $125 per day of twenty-two hours. This dredge was employed six and one-half days dredging the shoal places in the river and removed about 14,000 cubic yards of material at a total cost of $852.50.

As on almost all rivers, some deteoriation occurs from time to time at this locality, due to deposit of detritus during freshets and high water of the rainy seasons. Recent dredging in this river has restored the channel to the full width and depth authorized by the approved project, so that no further work will be necessary until after the next rainy season has passed.

This locality is considered worthy of further improvement to the extent of maintaining the width and depth of channel authorized in the approved project.

Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912, for maintenance of improvement ..... [a] $5,000
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

Total of appropriations to December 31, 1890	[b] $13,000
July 13, 1892	2,500
August 18, 1894	2,500
March 3, 1905	2,500
March 2, 1907	2,500
June 25, 1910	2,000
Total	25,000

CONTRACTS IN FORCE.

Contract dated June 9, 1910, for lease of clam-shell dredge *Golden Gate*, for dredging in Mokelumne River, California.
Name of contractor: N. R. Harris.
Rate: $125 per day of 22 hours.
Date of commencement: June 16, 1910.
Date of completion: Still in force; will be completed about July 20, 1910.
Date of approval: Emergency contract not approved by Chief of Engineers.
Date of expiration: July 29, 1910.

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[a] Exclusive of the balance unexpended July 1, 1910.
[b] See House Doc. No. 421, 57th Cong., 2d sess., p. 236.

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COMMERCIAL STATISTICS.

VESSEL CLASSIFICATION.

It has been impossible in the limited time allowed to obtain exact data as to the length of haul of the freight carried on this river or as to the rate per ton-mile.

Freight traffic.

Article.	Amount in short tons.	Valuation.	Article.	Amount in short tons.	Valuation.
Fruit	25	$1,000	Lumber	72	$1,080
Potatoes and onions	16,510	660,400	Vehicles	14	14,000
Beans	3,316	215,540	Live stock	332	66,400
Grain and flour	674	23,590	Merchandise	4,926	985,200
Vegetables	1,620	22,080			
Canned goods	531	53,100	Total	28,020	2,042,400

It has been impossible as yet to obtain any definite data as to average length of haul or rate per ton-mile for this river.

SS 9.

IMPROVEMENT OF PETALUMA CREEK AND NAPA RIVER, CALIFORNIA.

(A) PETALUMA CREEK.

At the beginning of the fiscal year there were two dredging contracts in force with J. S. McAnany. These were completed early in the fiscal year. Under the first contract a total of 10,247 cubic yards of material was removed, at a cost of 13.5 cents per cubic yard. Under the second contract a total of 12,000 cubic yards was removed, at a cost of 17.5 cents per cubic yard. Owing to inability to secure reasonable bids no other work was done during the year in this locality, although money was available and some work of maintenance was needed for the interests of navigation.

There is deterioration here due to the ordinary shoaling in the channel. This occurs from year to year, as in all other similar localities. To restore the channel to width and depth required by approved project will require the excavation of a considerable amount of silt, but the exact amount and cost of removal can be determined only by a survey, which is in progress, but not yet completed. There are funds available for the purpose, and the work will be done in the near future. Aside from the channel in the creek proper, there has been a gradual shoaling in San Pablo Bay at the approach to the mouth of the creek. This shoaling has been accumulating for many years, and now it seriously hampers navigation in and out of the creek. No work has ever been done at this point, so that this can not be considered strictly a deterioration of any work of improvement.

This locality is considered worthy of further improvement to the extent of maintaining the present authorized channel in the creek proper, and also providing a channel of corresponding width and depth across the flats in San Pablo Bay at the approach to the mouth of the creek.

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Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912, for maintenance of improvement	[a] $6,000

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

Total of appropriations to December 31, 1902 (see H. Doc. No. 421, 57th Cong., 2d sess., p. 237)	$68,000
March 3, 1905	2,000
March 2, 1907	15,239
March 3, 1909	10,000
March 12, 1909 (allotted by transfer of funds)	2,000
June 25, 1910	5,000
Total	102,239

CONTRACTS IN FORCE.

Contract dated April 1, 1909, for dredging 10,000 cubic yards of material from Petaluma Creek, California.
Rate: 13½ cents per cubic yard.
Name of contractor: J. S. McAnany.
Date of commencement: April 6, 1909.
Date of completion: July 26, 1909.
Date of approval: This was an emergency contract and was not approved by the Chief of Engineers.
Date of expiration: May 7, 1909.

Contract dated May 24, 1909, for dredging 12,000 cubic yards of material from Petaluma Creek, California, in extension of the work under the contract next above.
Rate: 17½ cents per cubic yard.
Name of contractor: J. S. McAnany.
Date of commencement: May 29, 1909.
Date of completion: August 10, 1909.
Date of approval: This was an emergency contract and was not approved by the Chief of Engineers.
Date of expiration: June 30, 1909.

COMMERCIAL STATISTICS.

Vessel classification.

Class.	American.	Net registered tonnage.	Passengers.
Registered:			
Steamers	8	2,228.45	6,400
Sailing	83	3,731.90	.....
Total	91	5,960.35	6,400

[a] Exclusive of the balance unexpended July 1, 1910.

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Freight traffic.

Article.	Amount in customary units.	Amount, in short tons.	Valuation.	Average haul or distance freight was carried.
				Miles.
Automobiles	122		$220,300.00	38
Beer	7,000 packages		12,237.90	38
Box shooks	5,141 bundles		4,896.00	38
Butter and cheese		580	323,141.00	38
Brick	600,000		4,800.00	38
Canned goods		842	168,400.00	38
Cement	1,150 barrels		3,162.50	38
Eggs	6,306,422 dozen		1,891,926.60	38
Feed		4,832	151,184.00	38
Grain		65,617	2,255,605.00	38
Dried fruits		1,999	259,350.00	38
Fruits and vegetables		6,554	531,228.00	38
Hay and straw		3,430	46,031.00	38
Furniture, etc		830	20,750.00	38
Groceries		9,360	1,029,600.00	38
Hides		757	343,400.00	38
Horses and cattle	5,826 head		148,920.00	38
Lumber	182,840,000 feet		1,093,318.00	38
Mill stuffs, etc		10,352	320,310.00	38
Oil (crude)	21,759 barrels		38,340.00	38
Poultry	102,600 dozen		305,045.00	38
Live sheep and hogs	785 head		7,292.00	38
Shingle, laths, and shakes	56,934 bundles		30,172.00	38
Wagons and buggies	1,212		103,020.00	38
Wines and liquors		13,238	794,280.00	38
Miscellaneous		23,057	998,716.20	38
Total		[a] 178,095	11,015,425.20	

[a] Estimated.

Rate per ton-mile, 2½ to 7 cents, according to Western Freight Classification.

It has been impossible to give the exact total tonnage, as the weights of certain items, consisting of packages, bundles, etc., can not be ascertained.

Traffic the past year was somewhat hampered by lack of sufficient depth of water in the channel, with the result that steamers had to leave according to the tides, and consequently many passengers departed by railroad who otherwise would have taken the steamers if reliable regular schedules were maintained. A greater depth would also permit coastwise sailing vessels to land lumber and other products at Petaluma without the now customary transfer at San Francisco.

(B) NAPA RIVER.

The first work done during the fiscal year was a survey made in November, 1909, at a total cost of $456.39, to determine the amount and character of work necessary to restore the channel of the river to the width and depth authorized by approved project. When this survey was completed and the usual map made, specifications were written for a contract. Contract was entered into on April 7, 1910, with J. C. Franks, and a total of 31,977 cubic yards of material was removed at 11⅞ cents per cubic yard, and then a rocky shoal near the bend below Asylum Slough was broken up with dynamite by hired labor, and the rock thus broken up was removed by leased dredge. All this work was done at a total cost of $3,250. There is need of making two cut-offs in this river at Car Bend and Jacks Bend, and it is expected to arrange for obtaining the necessary right of way and making the cut-offs in the near future.

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This river, as others, deteriorates from the deposit of silt. This river has recently been dredged out to full width and depth of authorized channel and no further work is now necessary. This locality is considered worthy of further improvement to the extent of maintaining the present authorized channel.

Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912, for maintenance of improvement ..... [a] $5,000

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

August 11, 1888	$7,500.00	March 12, 1909, withdrawn and allotted to Petaluma Creek	$2,000.00
September 19, 1890	10,000.00		
August 18, 1894	4,000.00		44,929.36
June 3, 1896	4,000.00	June 25, 1910	5,000.00
June 13, 1902	3,000.00		
April 28, 1904 (allotted)	4,429.36	Total	49,929.36
March 3, 1905	1,000.00		
March 2, 1907	8,000.00		
March 3, 1909 (allotment)	5,000.00		
Total	46,929.36		

CONTRACTS IN FORCE.

Contract dated April 7, 1910, for dredging and removing snags in Napa River, California.
Rate: 11¼ cents per cubic yard for dredging, and $10 each for removing snags.
Name of contractor: J. C. Franks.
Date of commencement: April 12, 1910.
Date of completion: May 9, 1910.
Date of approval: Emergency contract not approved by Chief of Engineers.
Date of expiration: June 21, 1910.

Contract dated May 7, 1910, for lease of clam-shell dredge *Tule Queen* for dredging in Napa River, California.
Rate: $125 per day of 22 hours.
Name of contractor: J. C. Franks.
Date of commencement: May 10, 1910.
Date of completion: May 11, 1910.
Date of approval: Emergency contract not approved by Chief of Engineers.
Date of expiration: May 19, 1910.

COMMERCIAL STATISTICS.

VESSEL CLASSIFICATION.

It has been impossible in the limited time allowed to obtain exact data as to vessels using this waterway, but it is known that the vessels are the ordinary river steamers and sailing boats that frequent waters of this vicinity and that they are of American register and carry quite a number of passengers.

[a] Exclusive of the balance unexpended July 1, 1910.

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Freight traffic.

Articles.	Amount, in short tons.	Valuation.	Average haul or distance freight was carried.
			Miles.
General merchandise	22,420	$4,035,600	44
Wines, liquors, and beer	18,580	929,000	44
Fruits and vegetables	4,603	276,180	44
Lumber, lime, cement, sand, and bricks	31,542	377,504	44
Hides, tallow, etc	1,949	334,950	44
Gravel	159,500	119,625	44
Live stock and vehicles	860	86,000	44
Hay, grain, feed, and mill stuff	10,247	204,940	44
Total	249,701	6,363,799	

Rate per ton-mile, 2½ to 7 cents, according to Western Freight Classification.

SS 10.

IMPROVEMENT OF HUMBOLDT HARBOR AND BAY, CALIFORNIA.

No work was done during the year at this locality. The need of restoration of the jetties is very great, as shipping in and out of the harbor is greatly handicapped by the entirely insufficient depth of water over the bar and by the crooked and constantly changing channel.

The deterioration at this locality is found principally in the jetties. From a survey made in 1907 it was estimated that it would require $1,037,400 to restore these jetties to their original condition. (See H. Doc. No. 950, 60th Cong., 1st sess.) This is considered the most urgent work in this district.

Some deterioration has taken place in the channel in front of Eureka and other towns, and the necessary repair is estimated for in the money statement under head of maintenance.

Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912, for maintenance of improvement:	
Reconstruction of jetties	$170,000
Channel in front of Eureka	15,000
	[a] 185,000

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

Total of appropriations to December 31, 1902 (see H. Doc. No. 421, 57th Cong., 2d sess., p. 236)	$2,187,615
March 2, 1907	83,000
June 25, 1910	150,000
Total	2,420,615

[a] Exclusive of the balance unexpended July 1, 1910.

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COMMERCIAL STATISTICS, 1909.

Season of navigation.—Opened January 1; closed December 31.

Vessel classification.

Class.	American.	Foreign.	Total.	Net registered tonnage.	Passengers.
Registered:					
Arrivals—					
Steamers	858	20	878	521,245	16,745
Sailing	39	6	45	27,842	.....
Departures—					
Steamers	860	19	879	517,433	17,167
Sailing	34	7	41	28,355	.....
Unregistered, dredge	1	.....	1	.....	.....
Total	1,792	52	1,844	1,094,875	33,912

Freight traffic.

Article.	Amount, in customary units.	Amount, in short tons.	Valuation.
General merchandise	.....	78,743	$3,937,200
Fuel oil	131,448 barrels	21,689	125,700
Coal	.....	3,365	24,500
Iron, machinery, boilers, etc	.....	296	122,700
Hay	.....	1,023	20,000
Live stock, hides, and fish	.....	724	53,300
Miscellaneous	.....	18,892	537,330
Dairy products	68,469 cases, etc	3,250	1,603,100
Live stock	9,759 tons	2,008	217,870
Wool and mohair	1,729 bales, etc	295	153,780
Meats, pelts, animal products	.....	774	95,420
Fish, shellfish, etc	.....	1,121	165,810
Fruit, grain, vegetables, etc	75,340 boxes, sacks, etc.	2,757	102,120
Manufactures	.....	1,541	383,880
Hardware, etc	.....	354	35,350
Lumber	339,891,500 feet	545,194	6,093,000
Total	.....	682,026	13,671,060

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APPENDIX T T.

IMPROVEMENT OF RIVERS AND HARBORS IN THE SECOND SAN FRANCISCO, CALIFORNIA, DISTRICT.

REPORT OF CAPT. THOS. H. JACKSON, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1910.

IMPROVEMENT.

Sacramento and Feather rivers.

UNITED STATES ENGINEER OFFICE,
San Francisco, Cal., July 16, 1910.

SIR: I have the honor to forward herewith the annual report of the Board of Engineer officers for the improvement of the Sacramento and Feather rivers, California, for the fiscal year ending June 30, 1910.

Very respectfully, your obedient servant,

THOS. H. JACKSON,
Captain, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. Army.

REPORT OF BOARD OF ENGINEERS.

UNITED STATES ENGINEER OFFICE,
San Francisco, Cal., June 30, 1910.

SIR: The Board of Engineers created by the act of Congress approved June 3, 1896, "for the purpose of making surveys and examinations" of the Sacramento and Feather rivers, to "submit the most feasible plan for the improvement of said rivers and the maintenance of navigation thereon, and to have charge of the work by them recommended as appropriations are made therefor," has consisted during the past fiscal year of Lieut. Col. John Biddle, Maj. C. H. McKinstry to July 31, 1909, Capt. Thos. H. Jackson, and First Lieut. Charles T. Leeds, Corps of Engineers, since July 31, 1909.

For general information concerning the project for improvement attention is invited to the summary of this report.

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For details concerning the operations during the past fiscal year attention is invited to the accompanying report of Capt. Thos. H. Jackson, Corps of Engineers, secretary and disbursing officer of the Board, in immediate charge of the work.

The present project for improvement (reports of Board of Engineers printed in the Annual Reports of the Chief of Engineers for 1898, pp. 2944–2945, and for 1899, pp. 3171–3181) as adopted by the act of Congress approved March 3, 1899, and by subsequent acts, provided for obtaining and maintaining the following-named channel depths in the Sacramento River by continuing the work of removing snags and other obstructions and by the construction of wing dams to concentrate the flow at shoal places, at an estimated first cost of $280,000 and an annual expense of $25.000; mouth of river to Sacramento (61 miles), 7 feet; Sacramento to Colusa (90 miles), 4 feet; Colusa to Red Bluff (107 miles), 3 feet. Of the estimated first cost of $280,000 the total of only $37,212.71 was expended. In 1899, with the funds appropriated March 3, 1899, and in the years 1900 to 1903, inclusive, with funds appropriated by the same act and by the act of June 6, 1900, the work of obtaining the channel depths in the Sacramento River was vigorously and successfully prosecuted. The improvement resulting from these operations was notable, especially in the 61 miles of the stream between its mouth and Sacramento. In this stretch of the river numerous wing dams were constructed of piles, rock, and brush to concentrate the flow at shoals to cause scour, and thus obtain increased depths over the shoals. Approximately 8,815 linear feet of wing dams were built, at a cost of $37,212.71. These wing dams have served their purpose well, but they have now become so deteriorated that they practically need rebuilding. Their deterioration of late years has been so great that the channel shows signs of becoming impaired. It is deemed very necessary that the more important of these wing dams should be restored during the fiscal year 1912. To do this and to maintain the navigable channel from Sacramento to Red Bluff by removing snags and other similar obstructions brought into the river during the winter months, it is estimated that the sum of $40,000 will be required during the fiscal year ending June 30, 1912. Of this sum it is estimated that $17,500 will be needed to rebuild 3,500 linear feet of wing dams, at $5 per foot, and that the remainder will be needed to operate the U. S. snag boat *Seizer* in removing snags, during six months, at a monthly expense of $3,750. The Sacramento River is well worthy of improvement to the extent contemplated by the existing project.

Attention is invited to the fact that practically all previous boards have pointed out the necessity for an annual appropriation of $25,000 to maintain the channel depths called for by the existing project. Since this project was adopted the funds provided for maintenance have averaged about $16,500 per annum. The effect of failure to provide the $25,000 annually needed for the work of maintenance is now shown in a deteriorating channel. Great areas of land along the river are under a high state of cultivation, and practically all of the territory along the river is dependent upon the stream as a means of transportation for passengers and freight. Much of the freight carried is of a perishable nature. For these reasons it is of much

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importance that the navigable channels should not be permitted to deteriorate to such extent that they can not be used to transport the products of the country to market promptly when ready for shipment.

JOHN BIDDLE,
Lieut, Col., Corps of Engineers.
THOS. H. JACKSON,
Captain, Corps of Engineers.
CHAS. T. LEEDS,
First Lieut., Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

REPORT OF CAPT. THOS. H. JACKSON, CORPS OF ENGINEERS.

The operations during the fiscal year ending June 30, 1910, were confined to maintaining the navigable channels in the Sacramento River called for by the existing project, and consisted of removing snags and other obstructions, and cutting trees on the banks. This work has been carried on by hired labor, using the U. S. snag boat *Seizer*, with a crew of about 32 men.

The work done by the snag boat during the past year is shown in the following statement:

Between—	Distance (miles).	Logs, trees, stumps, and snags blasted or removed from river.	Trees and stumps cut on banks.
Collinsville and Sacramento	61	.....	.....
Sacramento and Colusa	90	125	55
Colusa and Chico Landing	51	1,530	266
Chico Landing and Red Bluff	56	127	2
Total	258	1,782	323

The projected least low-water channel in the Sacramento River of 7 feet from its mouth to the city of Sacramento, of 4 feet from the city of Sacramento to Colusa, and of 3 feet to Chico Landing has been maintained during the past year. From Chico Landing to Red Bluff the projected depth of 3 feet has existed during only a portion of the year (December to June), the navigable depth between these two points during the low-water season of the fall and summer months having been about 2 feet.

Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912, for maintenance of improvement ..... [a] $40,000
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

[a] Exclusive of the balance unexpended July 1, 1910.

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APPROPRIATIONS.

Previous projects: Acts of March 3, 1875, to August 18, 1894, inclusive		$760,000.00
Present project: Act of—		
March 3, 1899	$30,000.00	
June 6, 1900	60,000.00	
June 13, 1902	25,000.00	
April 28, 1904 (allotted)	22,000.00	
March 2, 1907	50,000.00	
March 3, 1909 (allotted Apr. 9, 1909)	25,000.00	
June 25, 1910	30,000.00	
		242,000.00
Receipts from sales		1,865.49
Total		1,003,865.49

CONTRACTS IN FORCE.

Abstract of contracts in force during fiscal year ending June 30, 1910.

Name of contractor.	Character of contract.	Price.	Date of beginning work.	Date of expiration.
Lindley & Co., Sacramento, Cal.	Furnishing groceries, etc.	a$1,096.52	Mar. 23, 1909	Dec. 31, 1909
Schmid & Parker Packing Co., Sacramento, Cal.	Furnishing meats, etc.	a1,096.75	.....do.....	Do.
William A. Curtis, Sacramento, Cal.	Furnishing vegetables, etc.	a 740.36	.....do.....	Do.
James B. Smith, San Francisco, Cal.	Furnishing coal	b 7.50	Apr. 13, 1909	Do.

a Estimated total amount involved by contract.
b Per ton of 2,240 pounds.

COMMERCIAL STATISTICS.

The freight and passenger traffic on the Sacramento and Feather rivers the past year was handled by 46 steamboats, 65 gasoline boats and launches, 46 barges, and, in the lower portions of the Sacramento River, by a number of gasoline and sail schooners.

The passengers and freight carried during the year ending December 31, 1909, as reported by the principal steamboat lines operating regularly, are as follows: Freight, 382,710 tons, valued at $26,737,187; passengers, 120,672.

The above does not include the freight carried by numerous craft which ply at irregular intervals nor the passengers carried by various launches plying between different points.

It is estimated that, all told, approximately 425,000 tons of freight, valued at $29,750,000, and 150,000 passengers were carried during the year.

The freight carried consists of merchandise of all kinds, the principal articles being lumber, brick, grain, fruit, and vegetables.

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APPENDIX U U.

IMPROVEMENT OF RIVERS AND HARBORS IN THE FIRST PORTLAND, OREGON, DISTRICT.

REPORT OF MAJ. J. J. MORROW, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1910.

IMPROVEMENTS.

1. Coquille River, Oregon.
2. Entrance to Coos Bay and Harbor, Oregon.
3. Coos River, Oregon.
4. Mouth of Siuslaw River, Oregon.
5. Tillamook Bay and bar, Oregon.
6. Dredging plant for use at harbors on coasts of Oregon and Washington.
7. Snake River, Oregon, Washington, and Idaho.
8. Columbia River and tributaries between Celilo Falls and mouth of Snake River, Oregon and Washington.
9. Columbia River between the foot of The Dalles Rapids and the head of Celilo Falls, Oregon and Washington.
10. Canal at the Cascades, Columbia River, Oregon.
11. Operating and care of canal and locks at the Cascades of the Columbia River, Oregon.
12. Columbia River between Vancouver, Washington, and mouth of Willamette River.

UNITED STATES ENGINEER OFFICE,
Portland, Oreg., July 11, 1910.

SIR: I have the honor to transmit herewith annual report for the fiscal year ending June 30, 1910, pertaining to improvement of rivers and harbors in the first Portland, Oreg., district. * * *

Very respectfully,

J. J. MORROW,
Major, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

U U 1.

IMPROVEMENT OF COQUILLE RIVER, OREGON.

Information concerning the status of work is given in the summary of this report.

OPERATIONS DURING THE FISCAL YEAR 1910.

On account of the completion of the approved project, no work was carried on at the entrance to the Coquille River during the last fiscal year other than caring for the government plant used in the

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construction of the jetties in former years and the collection of commercial statistics.

The last work was done on the north jetty in October, 1908, when it was completed to a length of 1,575 feet. The south jetty is 2,700 feet long and was finished in March, 1901. Both jetties are of the high-tide, rubble-stone type, and are 600 feet apart at their sea ends.

During the past year these jetties remained in fairly good condition. Their sea ends were beaten down somewhat by the heavy seas, but not enough to affect their control of the bar channel, which carries a depth to sea of about 10 feet at mean lower low tide.

The port of Siuslaw commission, which is improving the entrance to the Siuslaw River, Oregon, with funds raised by the port district, was permitted by the department to use the old government plant at the Coquille River, and the greater part of it was towed to the Siuslaw.

The act of June 25, 1910, appropriated $56,000, with a view to carrying out the project as printed in House Document No. 673, Sixty-first Congress, second session, which includes work previously recommended, as detailed in House Document No. 399, Sixtieth Congress, first session. This includes the removal of snags from the channel between the mouth of the North Fork and Bandon, the removal of obstructive rocks in the vicinity of Bandon, and dredging a low-water channel 9 feet in depth between Coquille and Riverton, and 10 feet in depth between Riverton and the bar entrance.

No work has been done on this project, as the act adopting the project and making the appropriation was not passed until too late to start operations within the fiscal year. The contemplated work would make navigation safer and easier for boats using the channel, and, in the opinion of the district officer, is considered worthy to the extent of carrying out the project.

As the appropriation made provision for one year's maintenance, no additional funds will be required for the fiscal year 1912.

APPROPRIATIONS.

Total appropriated to December 31, 1902 (see H. Doc. No. 421, 57th Cong., 2d sess.)	$240,000
March 3, 1905	55,000
March 2, 1907	60,000
June 25, 1910	56,000
Total	411,000

CONTRACTS IN FORCE.

Lease:
Name of lessor: Chris and Nels Rasmussen, Bandon, Oreg.
Date of lease: May 10, 1909.
Character: Hire and lease of one room.
Price: $7.50 per month.
Approved: Authorized by Chief of Engineers, April 21, 1908.
Date of beginning: May 10, 1909.
Date of expiration: May 9, 1911.

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COMMERCIAL STATISTICS, 1909.

Vessel classification.

Class.	American.	Net registered tonnage.	Passengers.
Unregistered (licensed and enrolled):			
Steamers	156	54,211	1,121
Sailing	61	17,258	
Gasoline	110	7,447	
Total	a 327	78,916	1,121

a Arrivals and clearances, irrespective of number of vessels.

Freight traffic.

Articles.	Amount, in customary units.	Amount, in short tons.	Valuation.	Rate per ton-mile.
Broom handles	609,000	203	$3,045	$0.0075
Chittim bark	21 tons	21	2,100	.0125
Coal	410 tons	410	1,640	.0037
Dairy produce	176 tons	176	59,840	.02
Fish	219 tons	219	26,280	.015
Fruit	82 tons	82	4,920	.01
Hay	14 tons	14	210	.0075
Live stock	40 head	20	2,500	.0625
Lumber	44,950,000 feet b. m	67,425	676,075	.005
Machinery	228 tons	228	22,800	.0325
Match wood	2,288 cords	2,288	13,728	.0075
Miscellaneous	10,660 tons	10,660	1,066,050	.0075
Piles	25,000 linear feet	434	2,000	.0075
Shingles	115,800 bundles	1,930	57,900	.01
Spars	15,730 linear feet	286	2,430	.0075
Vegetables	52 tons	52	2,080	.0075
Veneer	574 tons	574	114,800	.0075
Woolen goods	105 tons	105	52,500	.0075
Total		85,127	2,110,898	

Average haul on portion of river under improvement, 1 mile; total average haul, river and ocean, 425 miles.

U U 2.

IMPROVEMENT OF ENTRANCE TO COOS BAY AND HARBOR, OREGON.

Information concerning the approved project for improvement of Coos Bay and Harbor is given in the summary of this report.

OPERATIONS DURING THE FISCAL YEAR 1910.

No active operations under the approved project for the construction of jetties were carried on during the fiscal year.

The north jetty has subsided slightly under the action of the waves and the jetty tramway and wharf have been completely destroyed by the teredo and decay, but the jetty is still effective in maintaining a fairly good bar depth. During the winter pilots at one time reported as little as 17 or 18 feet on the bar channel at mean lower low tide—the present depth is about 19 or 20 feet.

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The emergency act of March 3, 1909, authorized the use of the unexpended balance for dredging in the inner harbor, and at the close of the last fiscal year active dredging operations were in progress with the U. S. dredge *Oregon*, constructed under appropriations made by act of March 2, 1907, for improving various harbors on the coasts of Oregon and Washington.

During July and August and the first three days in September the dredge was operated in the approved channel from a short distance below the Standard Oil dock in Marshfield to deep water opposite the upper part of North Bend, a distance of about 6,000 feet. Throughout this stretch a cut was made 160 feet wide and not less than 16 feet deep at low tide. One hundred and nineteen thousand cubic yards of material were excavated, composed principally of oyster shells. At the upper part of the cut, as far down as the stave mill, some of the material was pumped ashore behind bulkheads, but below it was deposited on shoals to the east of the channel.

Active dredging operations ceased September 3, and the work of preparing the dredge for a sea tow was completed September 14. The dredge was towed to sea over the bar September 16 by the tug *Holyoke* and arrived at Astoria September 20.

A new project for improvement of Coos Bay and Harbor is published in House Document No. 958, Sixtieth Congress, first session, which provides for such additional depth at the bar entrance as can be secured and maintained by a seagoing dredge without additional jetties, and for the completion of a channel 18 feet deep at mean lower low water up to the town of Marshfield by means of dredging. The act of June 25, 1910, appropriated $400,000 for this purpose, and it is proposed to construct a seagoing dredge at an approximate cost of $350,000, also to expend $50,000 in operating the dredge *Oregon* in the bay channels.

The deepening of the bar channel and maintenance of a channel of 18 feet to Marshfield is, in the opinion of the district officer, worthy of execution by the General Government.

Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912:	
For works of improvement	$20,000
For maintenance of improvement	20,000
	[a] 40,000

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

Appropriated to December 31, 1902 (see H. Doc. No. 421, 57th Cong., 2d sess.)	$938,750.00
April 5, 1905 (allotted to Coos River)	3,000.00
	935,750.00
June 25, 1910	400,000.00
Receipts from sales	354.48
Total	1,336,104.48

[a] Exclusive of the balance unexpended July 1, 1910.

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CONTRACTS IN FORCE.

Lease:
Name of lessor: Frank E. Peterson, Marshfield, Oreg.
Date of lease: March 26, 1909.
Character: Hire and lease of launch with crew, etc.
Price: $8 per day.
Approved: Authorized by Chief of Engineers, November 19, 1908.
Date of beginning: March 28, 1909.
Date of expiration: September 27, 1909.

COMMERCIAL STATISTICS, 1909.

Vessel classification.

Class.	American.	Net registered tonnage.	Passengers.
Unregistered (licensed and enrolled):			
Steamers	858	453,776	15,458
Sailing	104	38,949	
Gasoline	256	13,846	
Total	*1,218	506,571	15,458

*Arrivals and clearances, irrespective of number of vessels.

Freight traffic.

Articles.	Amount, in customary units.	Amount, in short tons.	Valuation.	Rate per ton-mile.
Broom handles	30,000	10	$150	$0.0075
Cement	5,130 barrels	1,026	12,312	.0062
Chittim bark	74 tons	74	7,400	.0125
Coal	28,232 tons	28,232	112,928	.0037
Cord wood	28 cords	42	84	.0075
Dairy produce	281 tons	281	95,540	.02
Eggs	400 cases	12	2,400	.01
Fish	932 tons	932	103,140	.015
Fruit	603 tons	603	36,180	.01
Grain	473 tons	473	9,469	.0075
Hay	576 tons	576	8,640	.0075
Ice	15 tons	15	30	.01
Live stock	104 head	52	6,500	.0625
Lumber	124,813,000 feet b. m.	190,367	1,921,155	.005
Machinery	112 tons	112	11,200	.0325
Match wood	11 cords	11	66	.0075
Miscellaneous	55,786 tons	55,786	5,578,600	.0075
Oils	6,325 barrels	1,265	3,795	.01
Railroad iron	30 tons	30	1,050	.01
Shingles	30,600 bundles	510	15,300	.0127
Shooks	333 cords	500	15,000	.0299
Vegetables	47 tons	47	1,880	.0075
Woolen goods	52 tons	52	25,800	.0075
Total		281,008	7,968,610	

Average haul on portion of river under improvement, 14 miles; total average haul on rivers and ocean, 400 miles.

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UU 3.

IMPROVEMENT OF COOS RIVER, OREGON.

Information concerning the project for this improvement will be found in the summary of this report.

OPERATIONS DURING THE FISCAL YEAR 1910.

No work was carried on during the fiscal year, as sufficient funds were not available to put the government snag scow in working order. The channels which were improved by snagging and dredging in former years by the Government by hired labor have been fairly well maintained, although some shoaling has taken place and a number of snags have been deposited by the freshets of the past two winters.

The act of June 25, 1910, appropriated $3,000 for maintenance, and it is proposed to expend these funds in fitting up the plant and in snagging and removing obstructions from the channel. This work, when completed, will be a benefit to navigation interests, and, in the opinion of the district officer, is considered worthy of execution by the General Government.

No funds will be necessary for maintenance during the fiscal year 1912, it being estimated that the maintenance work authorized by the act of 1910 will allow sufficient work to provide all necessary navigation facilities for two years.

APPROPRIATIONS.

Total appropriated to December 31, 1902 (see H. Doc. No. 421, 57th Cong., 2d sess.)	$10,000
April 5, 1905 (allotted from "Improvement of Coos Bay and Harbor, general improvement")	3,000
March 2, 1907	3,000
June 25, 1910	3,000
Total	19,000

COMMERCIAL STATISTICS, 1909.

Vessel classification.

Class.	American.	Net registered tonnage.	Passengers.
Unregistered (licensed and enrolled):			
Steamers	2	80	36,437
Gasoline	7	69	
Total	a9	149	36,437

a Number of vessels plying the river.

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Freight traffic.

Article.	Amount, in customary units.	Amount, in short tons.	Valuation.	Rate per ton-mile.
Coal	1,467 tons	1,467	$5,668	$0.015
Chittim bark	7 tons	7	700	.03
Dairy produce	3,658 tons	3,658	1,253,720	.02
Eggs	967 cases	29	5,800	.04
Fish	31 tons	31	3,720	.02
Fruit	805 tons	805	48,300	.02
Grain	517 tons	517	10,340	.02
Hay	257 tons	257	3,855	.02
Live stock	952 head	476	59,500	.07
Logs	13,360,000 feet b. m	26,717	80,151	.005
Lumber	777,000 feet b. m	1,165	11,650	.02
Machinery	245 tons	245	24,500	.05
Miscellaneous	4,336 tons	4,336	433,600	.02
Piles	167,200 linear feet	3,040	15,200	.005
Poles	4,125 linear feet	75	375	.005
Rock	1,533 cubic yards	2,300	3,450	.01
Vegetables	783 tons	783	31,320	.02
Total		45,908	1,991,849	

Average haul on portion of river under improvement, 7 miles; total average haul, 7 miles.

U U 4.

IMPROVEMENT OF SIUSLAW RIVER AT THE MOUTH.

For information concerning future work on, and the status of this improvement, attention is invited to the summary of this report.

OPERATIONS DURING THE FISCAL YEAR 1910.

No work has been carried on during the year by the General Government, as no funds were available until the passage of the act of June 25, 1910. The port of Siuslaw, a municipal corporation, was authorized by the Secretary of War, under date of July 23, 1908, to assist in the construction of the jetties, and began operations early in February under a fund of $100,000, which was realized by the port district through sale of bonds. A contract was made with Robert Wakefield under date of December 24, 1909, for extending the south jetty in accordance with the latest approved project, and under specifications approved by the district officer. Part of the old government plant belonging to Coquille River was loaned for use on this work, and by the end of the year the new receiving wharf had been completed, derricks erected, stone quarry opened, and machinery installed, about 1,000 feet of the south jetty tramway constructed, and about 2,000 tons of rock emplaced.

In view of the fact that the port of Siuslaw is to provide half the cost of construction, it is the opinion of the district officer that the mouth of Siuslaw River is worthy of improvement by the United States to the extent of the project.

Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912, for works of improvement ..... [a] $50,000
Submitted in compliance with requirements of sundry civil act of June 4, 1897.

[a] Exclusive of the balance unexpended July 1, 1910.

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APPROPRIATIONS.

Appropriated prior to adoption of present project (see H. Doc. No. 421, 57th Cong., 2d sess.)	$187,000.00
June 30, 1908, carried to surplus fund	24,838.00
	162,162.00
Received from sales	150.10
June 25, 1910	50,000.00
Total	212,312.10

UU 5.

IMPROVEMENT OF TILLAMOOK BAY AND BAR, OREGON.

Information concerning the status of this work will be found in the summary of this report.

OPERATIONS DURING THE FISCAL YEAR 1910.

At the beginning of the fiscal year the work of snagging and dredging in the bay channel between the town of Tillamook and Hobsonville was in progress by hired labor, with government plant, and was continued until September 11, when work was suspended on account of exhaustion of funds. A total of 5,000 cubic yards was removed from the cut opposite Bay City, and from the shoals between that point and cut-off and at Long jetty 10,000 cubic yards were removed.

The channel was left in fairly good condition as a result of this work, but the winter freshets shoaled Dry Stocking bar, and the port of Tillamook was authorized to use the government plant to deepen the channel. The dredge was operated about ten days in December, and removed 3,500 cubic yards of material, which work was believed to be sufficient at that time.

After the spring freshets had subsided the channel was again found to be in bad condition, and considerable trouble was experienced by boats using it. For this reason two allotments from the emergency fund were recommended, and a total of $1,500 was made available. The dredge was put into commission early in April, and redredged the channel over Dry Stocking bar and over shoal at end of Dicks jetty. These allotments were exhausted in the latter part of May, after which the port of Tillamook commission was again authorized by the department to continue the operations of the dredge under the supervision of the district officer until further funds should become available, and dredging was continued at Dicks Point and Bay City wharf shoals until the end of the present fiscal year.

The material dredged by the United States and by the port of Tillamook commission since April amounted to 20,602 cubic yards, making a total of approximately 44,824 cubic yards for the fiscal year.

The cuts over the shoals are usually completed to a ruling depth of 9 feet at mean high tide, with a width of from 60 to 120 feet.

In compliance with the request of the Board of Engineers for Rivers and Harbors a reexamination was made in July, 1909, of the surveys of Tillamook Bay and Bar to Tillamook City, Oreg., authorized in the river and harbor acts of 1902 and 1907, respectively, with a view to determining whether conditions had not changed since the reports were made.

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The report thereon is dated July 30, 1909, and recommends that the only work warranted at the time by the existing commerce is the expenditure of $5,000 for urgent maintenance work necessary, and $5,000 thereafter annually for the maintenance of the existing channel, and, in the opinion of the district officer, the improvement is a worthy object to that extent.

Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912, for maintenance of improvement ..... [a] $5,000
Sumitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

Appropriated to December 31, 1902 (see H. Doc. No. 421, 57th Cong., 2d sess.)	$105,700
March 3, 1905	10,000
March 2, 1907	10,000
March 3, 1909 (allotted Mar. 27, 1909, Apr. 20, 1909, May 4, 1910)	6,500
June 25, 1910	5,000
Receipts from sales	20
Total	137,220

COMMERCIAL STATISTICS, 1909.

Vessel classification.

Class.	American.	Net registered tonnage.	Passengers.
Unregistered (licensed and enrolled):			
Steamers	174	20,827	3,354
Sailing	17	4,502	
Gasoline	61	2,388	
Total	[a]252	27,717	3,354

[a] Arrivals and clearances, irrespective of number of vessels.

Freight traffic.

Articles.	Amount, in customary units.	Amount, in short tons.	Valuation.	Rate per ton-mile.
Coal	25 tons	25	$125	$0.0277
Dairy produce	1,981 tons	1,981	673,540	.0277
Grain	282 tons	282	5,640	.0277
Hay	102 tons	102	1,530	.0222
Lumber	3,311,000 feet b. m.	4,967	496,760	.0033
Machinery	90 tons	90	9,000	.0417
Matchwood	300 cords	300	1,800	.0277
Miscellaneous	17,252 tons	17,252	1,724,520	.0277
Vegetables	26 tons	26	1,040	.0277
Total		25,025	2,913,955	

NOTE.—Average haul on portion of river under improvement, 12 miles; total average haul, rivers and ocean, for all articles except lumber, 180 miles; total average haul, rivers and ocean, for lumber, 620 miles.

[a] Exclusive of the balance unexpended July 1, 1910.

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UU 6.

IMPROVING THE VARIOUS HARBORS ON THE COASTS OF OREGON AND WASHINGTON BY THE CONSTRUCTION AND EQUIPMENT OF A DREDGING PLANT FOR USE THEREON.

OPERATIONS DURING THE FISCAL YEAR 1910.

The harbors and rivers upon which improvements are in progress, or upon which improvements already completed require periodical work for their maintenance, are Tillamook Bay and bar, Coos Bay and Harbor, Coquille River, Oregon; Columbia River at Vancouver, Wash., and certain other works in the Seattle engineer district.

The river and harbor act of March 2, 1907, appropriated $100,000 for the construction of a pipe line suction dredge, and an 18-inch hydraulic dredge *Oregon*, with pipe line, was built for the United States by contract by the Portland Iron Works on plans and specifications furnished by the department. The contract price was $79,340, which was subsequently increased by the purchase of extra parts and equipment to the full $100,000 appropriated.

The dredge was completed at Portland, Oreg., in September, 1908, and towed to Coos Bay, where it was operated by hired labor under funds subscribed by the commercial interests of Coos Bay until May 1, 1909, after which she was operated under balance of old appropriation for improving Coos Bay authorized by the act of March 3, 1909. During the last fiscal year the dredge worked at Coos Bay from July 1 to September 3 continuing dredging operations in the channel between the Standard Oil dock and North Bend. One hundred and nineteen thousand cubic yards of material were removed in that time. A tabulated statement is herewith submitted, showing cost of operation of the *Oregon* and cost per cubic yard of materials removed at Coos Bay. The dredge was towed back to the Columbia River at Portland September 20. After undergoing repairs she was employed on the shoal in the Columbia River between Vancouver and the mouth of the Willamette River from October 6 to November 15. Upon the completion of the work and after being docked and caulked the dredge was towed to Grays Harbor, Washington, for use in the bay channel under the direction of the Seattle district. It is expected that the *Oregon* will be towed from Grays Harbor to Coos Bay this summer to operate on the bay channel. As the project is completed and funds exhausted, no further appropriation is recommended.

DREDGE OREGON.

Cost of operation, commencing September 16, 1908, ending September 16, 1909.

Items.	Amount.	Cost per month.
Labor	$16,874.05	$1,406.17
Fuel	5,694.15	474.51
Repairs and maintenance	[a] 14,001.95	1,166.83
Subsistence	3,707.60	308.97
Sundries	[b] 3,245.80	270.48
Total	43,523.55	3,626.96
Cost per day		120.90

[a] Includes $1,757 paid for pontons and spuds.
[b] Includes $2,898 paid for towing to and from Coos Bay. Dredge left Portland September 16, 1908. Commenced work October 13, 1908. Stopped work Sept. 3, 1909. Left Coos Bay September 16, 1909.

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Cubic yards removed, 528,644 (silt, oyster shells, sand, and some clay).
Cost per cubic yard, 8.2 cents.
Interest and depreciation would be $30 per day additional.

APPROPRIATION.

March 2, 1907 ..... $100,000

U U 7.

IMPROVEMENT OF THE SNAKE RIVER, OREGON, WASHINGTON, AND IDAHO.

Information concerning the details of this project, with the status of improvement, is given in the summary of this report.

OPERATIONS DURING THE FISCAL YEAR 1910.

This work is carried on by hired labor and use of government plant, under federal funds, for work above Riparia. For work between Riparia and mouth of Snake River the work has been done with funds appropriated by the State of Washington, using the government boats *Wallowa* and *Umatilla* when available, and drill scows constructed with state funds.

Owing to lack of funds the work above Riparia was limited to inspection of the river and the raking of gravel bars at Big Goose Island bar and Lower Penawawa Rapids, which work was done by hired labor and use of steamer *Wallowa*. A good depth of water was found between Riparia and Lewiston, and the channels show very little shoaling.

Work below Riparia was commenced in July and was pushed with energy until the funds were exhausted. A requisition for the final $15,000 of the $100,000 appropriated by the State of Washington in 1907 was not honored by the state auditor, for the reason that it had lapsed on April 30, 1909, prior to the requisition. On this account an allotment from the emergency act was recommended, and $10,000 was made available.

During July, August, and September drill scow *No. 1* worked at the shoal below Fivemile Rapids, known as the Potato Patch, and the steamer *Umatilla* worked at Long Crossing bar, Fish Hook Rapids, Three Island Bend, and Fivemile Rapids. These two pieces of plant were then returned to the Columbia River, the stage of water being favorable for commencing work.

The *Wallowa* and drill scow *No. 2* worked at Palouse Rapids, Rapid No. 5, Skiff Bar Rapid, Gores Dread, and Monumental Rapid, and the latter at Pine Tree Rapids. On account of the exhaustion of the funds, all field work was suspended about October 1 and the plant laid up until such time as funds were made available for further work.

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Following is a summary of the work done on Snake River during the season of 1909–10:

Rapids.	Rock blasted.	Rock in dams.	Number of drags with channel rake.
	Cu. yds.	*Tons.*	
Big Goose Island bar			144
Lower Penawawa			50
Palouse	271		
Rapid No. 5	6		
Skiff bar	3		
Gores Dread	5		
Monumental	4	945	22
Pine Tree Rapids	257		
Long Crossing bar		810	10
Fish Hook	32		31
Three Island Bend	25		
Fivemile Rapids	28		
Potato Patch	464		
Total	1,126	1,755	257

This is the third season in which work has been done on the river below Riparia from the funds appropriated by the State of Washington. Very considerable improvement has been made, but there yet remains as much more work to make the channel safely navigable at low-water stages.

The principal rapids which need attention are Fivemile, Pine Tree, Fish Hook, Rescue Island, Palouse, and Texas rapids. More or less work should be done at the following places: Hunter Rapid, Rapids No. 4 and No. 5, False Palouse Rapid, Gores Dread, Monumental Rapid, Rapid No. 11, Long Crossing bar, Simmons reef, Couch Island Rapid, Copelys Cut-off, Tiger Head Crossing, Ainsworth shoal, and at the mouth of the Snake River.

It is believed that a comparatively good low-water channel can be secured between Riparia and the mouth by continuing the work of blasting out obstructions, as the volume of water is sufficient. The act of June 25, 1910, appropriated $25,000 to be applied between the mouth and Pittsburg Landing, and operations under these funds will be commenced as soon as the river reaches a favorable stage.

In view of the revival of navigation and the interests to be served by securing a navigable channel, it is the opinion of the district officer that the expenditure of funds for that object is a worthy one.

Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912:

For works of improvement	$10,000	
For maintenance of improvement	5,000	
		[a] $15,000

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

[a] Exclusive of the balance unexpended July 1, 1910.

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APPROPRIATIONS.

Total appropriated to June 13, 1902, including $12,294.41 transferred by act of that date from appropriation for improving Clearwater River, Idaho (see H. Doc. No. 421, 57th Cong., 2d sess.)	$226,544.41
March 3, 1905	25,000.00
March 2, 1907	10,000.00
Appropriated by State of Washington	100,000.00
March 3, 1909 (allotted Mar. 30, 1909, and Oct. 7, 1909)	15,000.00
June 25, 1910	25,000.00
Receipts from sales	825.70
	402,370.11
Reverted to Washington state treasury	15,000.00
Total	387,370.11

COMMERCIAL STATISTICS, 1909.

Vessel classification.

Class.	American.	Net registered tonnage.
Unregistered, licensed, and enrolled river steamers	a 7	2,598

a Number of vessels plying the river.

Freight traffic.

Articles.	Amount, in customary units.	Amount, in short tons.	Valuation.	Rate per ton-mile.
Cement	1,290 barrels	258	$3,096	$0.0122
Flour	1,550 barrels	155	9,300	.0083
General merchandise	2,282 tons	2,282	228,200	.0302
Lumber	20,000 feet b. m	30	300	.020
Miscellaneous	153 tons	153	9,180	.0302
Wheat	857,466 bushels	25,724	643,100	.009
Other cereals	6,643 tons	6,643	132,860	.009
Total		35,245	1,026,036	

Average haul on portion of river under improvement, 80 miles; total average haul on rivers, 215 miles.

U U 8.

IMPROVEMENT OF THE COLUMBIA RIVER AND TRIBUTARIES ABOVE CELILO FALLS TO THE MOUTH OF THE SNAKE RIVER, OREGON AND WASHINGTON.

Information concerning this project, with the status of the improvement, is given in the summary of this report.

OPERATIONS DURING THE FISCAL YEAR 1910.

This work is in close connection with the Snake River improvement, and was carried on by the steamer *Umatilla* and drill scow

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No. 1. The scow was built by funds appropriated by the State of Washington. The steamer was built by the United States and put into commission in November, 1908.

Drill scow *No. 1*, which was laid up during the high-water season, and in August towed to Snake River, was returned on the 1st of October to Umatilla Rapids and worked at that place the balance of the season. Three reefs, amounting to 210 cubic yards, in the lower rapids, and 381 cubic yards of reef in the upper rapids, were blasted. The high water early in March stopped operations, and the scow was laid up for the high-water season.

The gasoline launch *Ocea* has been used as a tender to the scow, laying anchors, carrying supplies, etc.

The steamer *Umatilla* returned from the Snake River and commenced work on the 1st of October. This steamer was engaged part of the time towing the two drill scows into position for work and making inspection trips over the river.

Two temporary dams were nearly completed at Homly Rapids. Thirty-eight cubic yards of bowlders and points of reef were blasted from the channel in the vicinity of Homly Rapids, and 242 drags were made with the channel rake. Twenty-seven cubic yards of rock were blasted from Devils Bend Rapids, and at Umatilla Rapids 34 drags were made with the channel rake.

While engaged in towing drill scow *No. 2* to Pine Tree Rapids in August the steamer *Umatilla* struck a rock and broke several timbers in her hull. Temporary repairs were made, which lasted for a time, but early in February the leaks became so bad that the boat was taken to Riparia for repairs. After a delay of about one month in securing the ways the boat was hauled out and thoroughly repaired and laid up for the high-water season. She was put into commission again in June, preparatory to commencing operations.

The past winter has not been favorable for the progress of the work. In November high water caused a delay of two weeks, and in January the ice and cold weather again delayed the work for three weeks.

Following is a summary of the work accomplished:

	Rock blasted.	Drags made with channel rake.
	Cu. yds.	
Homly Rapids	38	242
Upper Umatilla Rapids	381	.....
Lower Umatilla Rapids	210	34
Devils Bend Rapids	27	.....
Total	656	276

The preceding year the equipment of one drill scow was lost and the scow badly damaged during the ice gorges on the Snake River. Careful watch was kept and every endeavor was used to protect the boats during the ice period, and fortunately no damage or loss was sustained.

The act of June 25, 1910, appropriated $90,000 for continuing this work, and with these funds available good results may be expected. At the close of the year preparations are in progress with a view to

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resumption of operations as soon as the water falls to a working stage. The plant will probably be used on the Snake River for a short period, as the working season is earlier than on the Columbia.

It is believed that a safer channel above Celilo would tend to develop a larger commerce on this portion of the river, and with the completion of the Dalles-Celilo Canal larger and more powerful boats will be used. For these reasons it is the opinion of the district officer that the improvement is worthy of being continued by the General Government.

Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912, for works of improvement ..... [a] $25,000
Submitted in compliance with requirements of sundry civil act of June 4, 1897.

APPROPRIATIONS.

Appropriated prior to adoption of present project	$120,000
March 2, 1907	120,000
Appropriated by State of Washington	25,000
June 25, 1910	90,000
Total	355,000

COMMERCIAL STATISTICS, 1909.

Vessel classification.

Class.	American.	Net registered tonnage.
Unregistered, licensed, and enrolled river steamers	[b] 6	1,946

[b] Number of vessels plying the river.

Freight traffic.

Articles.	Amount, in customary units.	Amount, in short tons.	Valuation.	Rate per ton-mile.
Cement	1,075 barrels	215	$2,580	$0.01
General merchandise	4,241 tons	4,241	424,100	.0247
Hay	75 tons	75	1,125	.009
Live stock	246 head	123	15,375	.04
Wheat	113,066 bushels	3,392	84,800	.009
Other cereals	375 tons	375	7,500	.009
Total		8,421	535,480	

Average haul on portion of river under improvement, 123 miles; total average haul on rivers, 200 miles.

[a] Exclusive of the balance unexpended July 1, 1910.

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UU 9.

IMPROVEMENT OF COLUMBIA RIVER BETWEEN THE FOOT OF THE DALLES RAPIDS AND THE HEAD OF CELILO FALLS, OREGON AND WASHINGTON.

Information regarding the details of this work, and the status of the project, will be found in the summary of this report.

OPERATIONS DURING THE FISCAL YEAR 1910.

Operations in connection with the construction of the canal entrance, boat basin, and upper lock were continued under contract with Messrs. Smyth and Jones dated August 10, 1905. The contractors resumed active operations about September 1, 1909, as soon as the summer freshet had subsided. This freshet left but a slight amount of deposit, which was removed. The contractors work included rock, common and sand excavation, riprap, placing concrete in walls and lock lining, building small concrete house, grading roadway, and some minor metal work.

The following is a detailed statement of the work performed by them during the fiscal year:

Classification.	Price.	Quantity.	Amount.
Concrete.....cubic yards..	$5.33	3,160.12	$16,834.44
Common excavation.....do....	.37	1,039.00	384.43
Solid rock excavation.....do....	.90	5,434.00	4,890.60
Sand excavation.....do....	.185	1,070.00	197.95
Riprap.....do....	1.65	175.00	323.75
Tile drain..... linear feet..	.15	53.00	7.95
Reenforcing rods.....pounds..	.0305	1,262.22	38.19
Cast iron.....do....	.125	374.50	46.81
Asphaltic cement.....do....	.025	1,110.00	27.75
Anchor holes.....linear feet..	2.50	7.97	19.91
Labor, force account.....	.....	.....	507.95
Total.....	.....	.....	$23,279.73

The contractors finished all work under their contract on May 11, 1910, and the progress since the beginning is shown by the following table:

Classification.	Estimated quantities.	Work done, fiscal year—					Total to June 30, 1910.
		1905-6.	1906-7.	1907-8.	1908-9.	1909-10.	
	Cu. yds.	*Cu. yds.*	*Cu. yds.*	*Cu. yds.*	*Cu. yds.*	*Cu. yds.*	*Cu. yds.*
Concrete	33,000	3,973	4,583	14,746	6,876	3,160.12	33,338.12
Solid rock excavation	81,000	19,595	21,423	6,965	17,703	5,434.00	71,120.00
Common excavation	35,700	11,195	5,493	16,689	1,775	1,039.00	36,191.00
Sand excavation	9,500	2,028	4,428	1,015	615	1,070.00	9,156.00
Riprap	9,000	733	2,520	1,299	1,610	175.00	6,337.00

Messrs. Caughren, Winters, Smith & Co., under contract dated September 10, 1908, to complete about 14,000 feet of the canal to the westward of the Smyth and Jones contract, except the concrete lining of the section in permeable material, continued active operations throughout the year, except when interrupted by high water. Work which was suspended on May 31, 1909, was resumed on August 10,

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and continued to about the middle of April, 1910, when high water again caused a suspension of operations.

The work, which is being done in accordance with the revised plans, consists principally of rock, gravel, and sand excavation, and building concrete walls on the sides of the canal.

At the close of the last fiscal year the contractors had practically completed the excavation and the embankments in the sand and gravel section, but had not finished enrocking the tops and sides of the embankments as designed.

On account of the rapid approach of high water, portions of the embankments were covered with a layer of coarse gravel as a protection against the flood.

When the water receded, it was found that the freshet had made a break through part of the unfinished embankment on the south side at station 332 and had also washed considerable of the sand and finer materials from the tops of the embankments toward the bottom.

During the year the embankments on both sides between stations 283 and 380 were covered with rock from the excavations to the westward of station 390 on their tops and outer slopes and widened out on top to a minimum width of 25 feet. The contractors have completed the rock cut at the west end of their contract near Tenmile Rapids and about 80 per cent of the rock excavation between stations 360 and 427.

It was originally thought that it would be practicable to excavate the rock cuts with comparatively smooth slopes of 4 on 1, and they were thus staked out, but as the work progressed, owing partly to the nature of the rock, it was found that the slopes were uneven and varied between 4 on 1 and 1 on 1, and in places the excavation exceeded the limits of the design. On the south side of the west cut and on the south side between stations 360 and 373 the slopes have been back filled with excavated rock 1 on 1 and paved with hand-placed riprap, by force account. This treatment promises to give very good results where the excavated rock slopes are too uneven to form suitable side banks for the canal.

The contractors have installed a concrete plant and have 4,000 barrels of standard cement on the ground which has been tested, also some gravel. The sand is obtained by rail from Umatilla, Oreg., about 85 miles east of Celilo. The work of placing concrete in the walls was just begun when high water stopped it.

It is thought that, with a favorable season, this contract will be finished during the next low-water period. The following table shows the progress of their work:

Classification.	Price.	Estimated quantities.	Work done fiscal year—		Total to June 30, 1910.
			1908-9.	1909-10.	
Solid rock excavation.....cubic yards..	$0.90	320,000	99,068	193,759	292,827
Sand excavation.....do....	.20	165,000	238,219	63,315	301,534
Common excavation.....do....	.28	165,000	158,020	15,717	173,737
Clearing.....acres..	25.00	5	5	.....	5
Overhaul.....per 1,000 feet..	.10	400,000	130,000	268,307	389,307
Labor, force account.....	.....	.....	.....	$8,462.81	$8,462.81

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Investigation made in 1908, based on complaints of steamboat men, developed the fact that further open river work was required at Threemile Rapids, the improvement of which is a part of the project. It was decided to remove, by blasting, two rocky points at Covington Point, and a projecting point of rock immediately below the entrance to the canal. The estimated cost of this work is about $45,000, and a contract for its execution was entered into with Robert Wakefield under date of October 14, 1909. The contractor commenced active operations November 2, 1909, but had to suspend work March 1, 1910, on account of high water, which came unusually early. One thousand eight hundred and thirty-nine cubic yards of class A rock were removed by the contractor during the season. Work will be resumed as soon as the water falls sufficiently, and it is expected that it will be completed before the next freshet.

The completion of this work is, in the opinion of the district officer, worthy of execution by the General Government. It is proposed to expend the available funds in further construction by hired labor and purchase of materials, this method being believed to be the most advantageous on account of greater flexibility.

Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912, for works of improvement	* $600,000

Submitted in compliance with requirements of sundry civil act of June 4, 1897.

APPROPRIATIONS.

Appropriated prior to adoption of present project (see H. Doc. No. 421, 57th Cong., 2d sess.)	$350,000.00
March 3, 1905	50,000.00
June 30, 1906	250,000.00
March 2, 1907	100,000.00
May 27, 1908	336,000.00
March 4, 1909	164,000.00
June 25, 1910	600,000.00
Receipts from sales	65.83
Total	1,850,065.83

CONTRACTS IN FORCE.

Formal:

Name of contractor: Smyth & Jones, Portland, Oreg.
Date of contract: August 10, 1905.
Character: Constructing portion of Dalles-Celilo Canal.
Approximate quantities (in place), with prices:
33,000 cubic yards plain concrete, at $5.33 per cubic yard.
81,000 cubic yards solid rock excavation, at 90 cents per cubic yard.
12,000 cubic yards sand excavation, at 18½ cents per cubic yard.
43,000 cubic yards common excavation, at 37 cents per cubic yard.

* Exclusive of the balance unexpended July 1, 1910.

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Formal—Continued.
Approximate quantities (in place) with prices—Continued.
9,000 cubic yards hand-placed riprap, at $1.85 per cubic yard.
100 feet b. m. oak timber, at $87 per thousand feet b. m.
1,500 feet b. m. fir timber, at $37 per thousand feet b. m.
200 linear feet test and anchor holes, at $2.50 per linear foot.
8,000 pounds structural steel shapes, at 12½ cents per pound.
105,000 pounds medium steel reenforcing rods, at $3.05 per hundredweight.
2,000 pounds cast iron, at 12½ cents per pound.
2 roller valves, complete, at $2,400 each.
27 tons asphaltic cement, at $50 per ton.
1,000 linear feet drain tile, at 15 cents per linear foot.
Approved: September 2, 1905.
Date of beginning: Thirty days after notification of approval of contract.
Date of expiration: December 31, 1906.
Extension: Time for completion extended a reasonable period.
Supplemental agreement to above contract dated August 25, 1906, provides that the contractor shall construct a culvert instead of digging the trench called for in specifications attached to original agreement.
Approved: September 12, 1906.
Supplement to above contract dated October 16, 1906, provides that the United States shall rent one 5-ton locomotive to Smyth & Jones, at the rate of $30 per month.
Approved: November 7, 1906.
Expiration of supplemental agreement: Any time after April 20, 1907.

Formal:
Name of contractor, Caughren, Winters, Smith & Co., Spokane, Wash.
Date of contract: September 18, 1906.
Character: Constructing portion of Dalles-Celilo Canal.
Approximate quantities (in place) with prices:
320,000 cubic yards solid rock excavation, at 90 cents per cubic yard.
165,000 cubic yards sand excavation, at 20 cents per cubic yard.
165,000 cubic yards common excavation, at 28 cents per cubic yard.
12,000 cubic yards concrete, at $7.50 per cubic yard.
4,000 cubic yards rubble masonry, at $6 per cubic yard.
1,000 linear feet bolt and anchor holes, at $1 per linear foot.
2,000 pounds cast iron, at 5 cents per pound.
1,000 pounds wrought iron, at 6 cents per pound.
2,000 pounds reenforcing rods, at 6 cents per pound.
1,000 linear feet drain tile, at 50 cents per linear foot.
5 acres clearing, at $25 per acre.
400,000 cubic yards overhaul, per 1,000 feet, at 10 cents per cubic yard.
Approved: November 9, 1906.
Date of beginning: Thirty days after date of notification of approval of contract.
Date of expiration: May 1, 1911.

Formal:
Name of contractor: Robert Wakefield, Portland, Oreg.
Date of contract: October 14, 1909.
Character: Removing rock from Columbia River near Big Eddy.
Approximate quantities with prices:
6,600 cubic yards, class A rock, at $2 per cubic yard.
7,600 cubic yards, class B rock, at $4 per cubic yard.
Approved: October 23, 1909.
Date of beginning: Thirty days after notification of approval of contract.
Date of expiration: Eighteen months after notification of approval of contract.

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COMMERCIAL STATISTICS, 1909.

Vessel classification.

Class.	American.	Net registered tonnage.	Passengers.
Unregistered licensed and enrolled river steamers	a 5	1,815	93

a Number of vessels working in connection with Oregon State Portage Railway.

Freight traffic handled by Oregon State Portage Railway between Big Eddy and Celilo, Oregon.

Articles.	Amount, in customary units.	Amount, in short tons.	Valuation.	Rate per ton-mile.
Barley	18,480 bushels	462	9,240	$0.0277
Cement	8,625 barrels	1,725	20,700	.0277
Coal	5,040 tons	5,040	25,200	.044
Fish	120 tons	120	14,400	.0555
General merchandise	6,384 tons	6,384	638,400	.0555
Bags, etc.	240 tons	240	24,000	.0555
Hay	200 tons	200	3,000	.0277
Ice	150 tons	150	450	.1111
Livestock	104 head	52	6,500	.222
Lumber	1,000,000 feet b. m	1,500	15,000	.0555
Machinery	363 tons	363	36,300	.0555
Miscellaneous	5 tons	5	300	.0555
Oats	10,000 bushels	160	3,200	.0277
Powder	350 tons	350	122,500	.1111
Railroad iron, etc	320 tons	320	11,200	.0555
Sand and gravel	3,230 cubic yards	4,850	4,850	.0277
Wheat	118,700 bushels	3,561	87,925	.0277
Total		25,482	1,023,165	

Average haul, length of Portage Railway, 9 miles.

U U 10.

CANAL AT THE CASCADES, COLUMBIA RIVER, OREGON.

Information concerning this project and the status of the improvement will be found in the summary of this report.

OPERATIONS DURING THE FISCAL YEAR 1910.

The status of this improvement remains practically as reported for several years past, as no funds have been available for finishing the incompleted items of the approved project. No construction was carried on during the year, all expenditures having been on account of maintenance.

The completion of the land wall on the south side of the upper lock is the largest and most important item of the uncompleted project which should be undertaken. This wall would replace a sloping earth bank, restrict the capacity of the lock to its contemplated dimensions, and shorten the time of lockage. It would also obviate

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the threatened danger of the water of the upper lock cutting away past the cut-off wall which extends into the bank opposite the middle gates. During the last high water considerable seepage was observed at this point, and should it get beyond control much damage might result.

The estimated cost of the south wall is $100,000. It is believed that this wall could be built of concrete instead of cut masonry, like the north wall, at a saving in cost and without any sacrifice to appearances.

Another important item is the improvement of the open channel in the river immediately below the locks by the removal of submerged reefs and bowlders, which endanger navigation. Five thousand dollars has been provided for this work by the river and harbor act of June 25, 1910, and it is proposed to do the work during the next period of low water.

For the reasons given above, it is the opinion of the district officer that this work is worthy to the extent of completing the south wall of the upper lock; also that the open-channel work below the locks is necessary for the safer navigation of the channel.

APPROPRIATIONS.

Appropriated prior to adoption of the modified project of 1894 (see H. Doc. No. 421, 57th Cong., 2d sess.)	$3,443,403.00
June 3, 1896	50,000.00
June 11, 1896	179,597.00
March 3, 1899	75,000.00
June 13, 1902	80,000.00
March 3, 1905	80,000.00
March 3, 1905 (allotted)	1,000.00
June 25, 1910	5,000.00
Receipts from sales	11,629.48
Total	3,825,629.48

U U 11.

OPERATING AND CARE OF CANAL AND LOCKS AT THE CASCADES OF THE COLUMBIA RIVER, OREGON.

The canal and locks around the Cascades of the Columbia River are about 150 miles above the mouth of the latter in the Pacific Ocean, and, though not wholly finished, are able to pass steamboats drawing 8 feet of water. They were formally opened to navigation on November 5, 1896.

OPERATIONS DURING THE FISCAL YEAR 1910.

The locks have been available for the passage of boats except from January 3 to 17, inclusive, when they could not be used on account of heavy ice in the entrances. On January 18 the locks were again

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in commission, but on account of the heavy ice blockade in the river between Lyle and The Dalles there was no traffic through them until January 24.

In addition to the usual work of care and maintenance of the locks, grounds, pipe line, and machinery, the canal entrances were dredged to clear them of silt deposited by the previous freshet. This work was done by hired labor and the government dredging plant, consisting of a 1-yard orange-peel bucket dredge and two bottom-dump scows.

Dredging operations were carried on from September 15 to November 22, except from October 15 to 23, when the dredge was rented to the Wind River Lumber Company to remove deposit from the low-water line to the foot of the log incline, no other dredge being available for hire in this locality.

The dredge worked five days in the lower entrance to remove deposit between the lower gate and the outlets of the main culverts—the rest of the time in the upper entrance. Altogether 24,778 cubic yards of deposit were removed, at a total cost of $2,663.87, equal to 10¾ cents per cubic yard. Besides the dredging, the accumulated deposit on top of the walls of the lower entrance, at reference 92, was removed by hand.

The dredging resulted in thoroughly cleaning out the deposit from the upper entrance. The present freshet will no doubt make the usual deposit, and it is expected to redredge the entrances again next autumn.

At the close of the last fiscal year the work of installing a new air-compressor plant in the carpenter shop for use in connection with a sand-blast apparatus for cleaning the steel lock gates was in progress. This work was completed in July and the sand-blasting apparatus repaired and assembled in August, and the work of cleaning and painting the lock gates began in September. The lower sections of the gates were found to be considerably rusted and pitted After the removal of the old paint and rust the gates are given a first coat of red lead and oil and a second coat of metallic paint from their tops down to the water line. This painting work was much interrupted during the year on account of the wet weather, but has been continued until the present time and the work at the middle and upper guard gates about completed, except some of the lower portions which will have to be done at low water. It is expected to complete painting all the gates during next low water.

During the year, in addition to the installation of a new cable-tightening device for the gates, the old guide sheaves in the cable alleys, which had become badly worn, were replaced by new ones.

The contemplated installation of an electric-light plant at the locks has been abandoned, as the Wind River Lumber Company has put such a plant in operation and sells current to users in the town. It is proposed, in the near future, to put fixtures in the various buildings, extend wires to the mill, and purchase current.

Summary of expenditures made in operating and caring for Cascades Canal, Oregon, during the fiscal year ending June 30, 1910, submitted in compliance with river and harbor act of July 5, 1884,

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as amended and reenacted by section 6 of the river and harbor act of March 3, 1909:

Office expenses, superintendence and contingencies	$9,467.71
Labor (operating and maintenance)	3,614.24
Materials for repairs, etc	793.86
Tools, oil, fuel, etc	503.58
Total	14,379.39

Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912, for maintenance of improvement	[a] $15,072.39

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

ALLOTMENTS.

Total allotments to July 12, 1902	$44,132.17
July 8, 1903	5,000.00
June 24, 1904	7,100.00
May 24, 1905	3,000.00
July 3, 1905	18,500.00
July 10, 1906	14,150.00
July 6, 1907	7,250.00
October 30, 1907	1,500.00
July 1, 1908	14,000.00
July 17, 1908	11,000.00
July 19, 1909	4,208.54
Total	129,840.71

CONTRACTS IN FORCE.

Lease:
Name of lessor: J. K. Simpson, Stevenson, Wash.
Date of lease: September 10, 1909.
Character: Hire and lease of steam tug, with crew, etc.
Price: $17 per day.
Approved: Authorized by Chief of Engineers, September 9, 1909.
Date of beginning: September 10, 1909.
Date of expiration: January 9, 1910.

COMMERCIAL STATISTICS.

Summary of vessels locked through the canal.

Class.	Number of passages.	Number of lockages.	Registered tonnage.	Passengers.	Delays to vessels.	
					Number.	*H. m.*
American:						
Licensed and enrolled river steamers and launches	937	.....	.....	.....	5	7 34
Barges	2	.....	.....	.....	.....	.....
Rafts	1	.....	.....	.....	.....	.....
Total	940	914	408,749	93,369	5	7 34

[a] Exclusive of the balance unexpended July 1, 1910.

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Freight traffic.

Articles.	Amount, in customary units.	Amount, in short tons.	Valuation.	Rate per ton-mile.
Wheat	141,900 bushels	4,257	$127,710	$0.012
Other grains	901 tons	901	18,020	.012
Flour	3,722 barrels	205	1,225	.012
Hay	420 tons	420	8,400	.012
Cattle	652 head	326	16,300	.025
Horses	4,971 head	3,123	347,970	.025
Sheep	7,672 head	383	30,688	.075
Other live stock	74 head	7	1,332	.075
Wool	226,000 pounds	113	45,200	.04
Fruit	112,000 pounds	56	3,360	.018
Lumber	273,485 feet b. m	410	4,102	.018
Powder	523 tons	523	7,345	.05
Miscellaneous	21,910 tons	21,910	1,314,600	.03
Total		32,794	1,927,352	

Average haul on portion of river under improvement, 4 miles; maximum haul on rivers, 388 miles; total average haul on rivers, 200 miles.

U U 12.

IMPROVEMENT OF THE COLUMBIA RIVER BETWEEN VANCOUVER, WASHINGTON, AND THE MOUTH OF WILLAMETTE RIVER.

Information concerning the details of this work, with status of improvement, will be found in the summary of this report.

OPERATIONS DURING THE FISCAL YEAR 1910.

In September a survey was made from the railroad bridge at Vancouver to the mouth of the Willamette River. This survey showed very little change from the previous year. The shoal abreast Hayden Island carried about the same depth of water, and the channel next to the island had not been maintained and had only a ruling depth of about 9 feet at low water.

The channel crossing over from Hayden Island to the Washington shore showed some improvement and was much shorter than the old channel. It carried a ruling depth of about 11 feet at low water. It was thought better to dredge this channel than the former one.

The dredge *Oregon* was towed from Coos Bay for this work, and began on October 6 dredging a channel across this shoal.

The project provides for a channel 150 feet wide and 20 feet deep at low water, but it was concluded that a cut 125 feet wide and 16 feet deep at low water would afford all the relief needed by navigation for that season. This cut was 3,800 feet long, and 75,000 cubic yards of material were dredged, at a cost of about 15 cents per cubic yard. The cost per cubic yard is larger than usual, but was increased by the numerous repairs to the main pumping engine and the heavy material dredged, which was largely heavy sand and gravel. The dredge was operated by hired labor, and coal and slab wood was used as fuel. The cut was completed by the middle of November, 1909, and the dredge placed in good repair and turned over to the Seattle district.

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The dike at the head of Oregon Slough has remained intact and requires no repairs at this time.

The district officer is of opinion that maintenance work that can not be done without the construction of additional plant is not worthy of execution by the General Government until such time as dredging plant may be necessary on channels leading to Portland, Oreg. This opinion was expressed in a report of an examination authorized by the river and harbor act of March 3, 1909, and made in April, 1910.

Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912, for maintenance of improvement	[a] $10,000

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

Total appropriations to 1902 (see H. Doc. No. 421, 57th Cong., 2d sess.)	$110,000
March 3, 1905	30,000
June 30, 1906	13,000
March 3, 1909 (allotted Mar. 30, 1909)	5,000
June 25, 1910	10,000
Total	168,000

[a] Exclusive of the balance unexpended July 1, 1910.

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APPENDIX V V.

IMPROVEMENT OF RIVERS AND HARBORS IN THE SECOND PORTLAND, OREGON, DISTRICT.

REPORT OF MAJ. J. F. McINDOE, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1910.

IMPROVEMENTS.

1. Willamette River, above Portland, Yamhill and Long Tom rivers, Oregon.
2. Operating and care of lock and dam in Yamhill River, Oregon.
3. Willamette River at Willamette Falls, Oregon.
4. Columbia and lower Willamette rivers below Portland, Oregon.
5. Mouth of Columbia River, Oregon and Washington.
6. Clatskanie River, Oregon.
7. Cowlitz and Lewis rivers, Washington.
8. Grays River, Washington.
9. Gauging waters of Columbia River, Oregon and Washington.

UNITED STATES ENGINEER OFFICE,
Portland, Oreg., July 14, 1910.

SIR: I have the honor to transmit herewith annual report for the fiscal year ending June 30, 1910, pertaining to improvement of rivers and harbors in the second Portland, Oreg., district.

* * * * * * *

Very respectfully,

J. F. McINDOE,
Major, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

V V 1.

IMPROVEMENT OF WILLAMETTE RIVER ABOVE PORTLAND, AND YAMHILL RIVER, INCLUDING THE MAINTENANCE OF LONG TOM RIVER, OREGON.

For history of this work, projects, and results accomplished, see current summary of this report.

OPERATIONS DURING THE FISCAL YEAR 1910.

Work on the Willamette River was carried on between Independence and the mouth of the Clackamas River, a distance of 72 miles, and consisted of snagging and removing other channel obstructions,

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dredging shoal bars, and making necessary repairs to dams and revetments. The work was done with the government plant, consisting of the combined dredge and snag boat *Mathloma*, dipper dredge *No. 2*, and a floating pile driver.

Dredge Mathloma.—This dredge, in commission during the months of July, August, September, and parts of October and November, removed from the channel 43,058 cubic yards of material, working on the following shoals and bars: Wheatland, Eldridge, Allison, Lambert, Coffee Chute, Candiani, Careys Bend, Ash Island, and Clackamas Rapids. From July to December, 26 snags were removed from the river by the dredge. In December she was laid up at the government moorings to be overhauled, and remained out of commission to the end of the fiscal year.

Dredge No. 2.—This dredge was in commission from June 20 to August 31, when she was laid up at the government moorings until the end of the fiscal year. Dredging was carried on at the following shoals and bars: Budds Chute, Eola, Keyser, Simon, Wheatland, Matheney, Gervais, Eldridge, Lambert, Faster, Five Islands, and Coffee Chute, from which a total of 18,087 cubic yards of material was removed.

Floating pile driver.—During September and October the pile driver and crew were engaged in repairing the dam and revetment at Wheatland, and in March, until the end of the year, in repairs to the revetment at Independence.

The bed of the upper Willamette River is composed of gravel, and the bars and shoals forming annually require frequent dredging. The cuts made during the fiscal year varied from 100 to 700 feet in length, excepting one cut of 2,803 feet at Careys Bend. The width obtained was from 35 to 50 feet, and the average depth 4½ feet at low water.

Following is a summary of the operations during the fiscal year:

Snag boat Mathloma.

Snags removed from channel	number	26
Gravel removed from channel	cubic yards	43,058
Total length of cuts	linear feet	4,978
Time actual dredging	hours	431
Time towing *No. 2*, repairing, etc	do	254
Fuel consumed (wood)	cords	207
Average monthly cost of operations		$1,200

Dipper dredge No. 2.

Gravel removed from channel	cubic yards	18,087
Total length of cuts	linear feet	8,850
Time actual dredging	hours	284
Time moving, repairing, etc	do	154
Fuel consumed (wood)	cords	45
Average monthly cost of operations		$800

Floating pile driver.

WHEATLAND DAM AND REVETMENT.

Piles driven	number	122
Brush fascines placed	cords	287
Stone placed	cubic yards	812
Pavement repaired	square yards	933
Cost of operations		$2,170

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INDEPENDENCE REVETMENT.

Piles driven	number	378
Rock used	cubic yards	552
Gravel used	do	263
Pavement repaired	square yards	2,347
Cost of operations		$4,599

During December, February, and May 177 snags were removed from the river by a small force of men with rowboats engaged for this purpose.

Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912, for maintenance of improvement ..... [a] $20,000
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

Appropriated prior to adoption of the present project (see H. Doc. No. 421, 57th Cong., 2d sess.)	$521,500.00
April 28, 1904 (allotted June 8, 1904)	12,000.00
March 3, 1905	50,000.00
March 2, 1907	60,000.00
March 3, 1909 (allotted Mar. 30, 1909, and Mar. 9, 1910)	25,000.00
July 25, 1910	60,000.00
Received on account of sales, etc	519.11
Total	729,019.11

NOTE.—By act of March 3, 1899, $3,000 was transferred to and expended on Long Tom River, Oregon.

COMMERCIAL STATISTICS.

Vessel classification.

Class.	American.	Net registered tonnage.	Passengers.
Unregistered licensed and enrolled river steamers	[b] 24	4,150	43,200

[a] Exclusive of the balance unexpended July 1, 1910.
[b] Number of vessels in the trade.

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Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Valuation.	Rate per ton-mile.
Cattle and horses	122 head	61	$9,150	$0.07
Coal	56 tons	56	406	.046
Fish	29 tons	29	3,480	.06
Flour	15,210 barrels	1,521	91,260	.02
Fruit	511 tons	511	30,660	.045
General merchandise	20,620 tons	20,620	2,062,000	.06
Hay	2,231 tons	2,231	33,465	.025
Hops	2,096 tons	2,096	419,200	.043
Logs (towed)	26,806,000 feet b. m	40,209	208,448	.0085
Lumber	724,000 feet b. m	1,086	10,860	.025
Miscellaneous	57,081 tons	57,081	3,424,860	.06
Oil	200,135 barrels	40,027	120,081	.04
Paper	38,879 tons	38,879	2,332,740	.04
Piles (towed)	176,000 linear feet	3,200	12,800	.0085
Potatoes	4,610,000 pounds	2,305	46,100	.026
Railroad iron	35 tons	35	1,225	.036
Sand and gravel	179,109 cubic yards	268,664	268,664	.005
Sheep and hogs	613 head	46	8,050	.12
Shingles	4,380 bundles	73	2,190	.05
Stone (barged)	15,666 cubic yards	23,500	23,500	.005
Wheat	91,900 bushels	2,757	68,925	.025
Other cereals	4,095 tons	4,095	81,900	.02
Wood (barged)	6,747 cords	16,120	25,300	.01
Wool	46 tons	46	10,120	.05
Total		519,280	9,295,384	

Average haul over portion of river under improvement, 70 miles; total average haul on rivers, 70 miles.

V V 2.

OPERATING AND CARE OF LOCK AND DAM IN YAMHILL RIVER, OREGON.

OPERATIONS DURING THE FISCAL YEAR 1910.

Operations during the year consisted in operating and keeping in repair the lock, dam, grounds, and government plant and property connected therewith.

The lock was operated seventy times during the year, was closed to traffic during sixty-eight days owing to high water, and was open during the remainder of the year.

No unusual repairs were needed, and the lock and connections were in good condition at the close of the year.

Summary of expenditures made in operating and caring for lock and dam in Yamhill River, Oregon, during the fiscal year ending June 30, 1910.

[Submitted in compliance with river and harbor act of July 5, 1884, and as amended by section 6 of the river and harbor act of March 3, 1909.]

Office expenses, superintendence, and contingencies	$90.00
Labor	876.75
Materials for repair, etc	43.64
Tools, oil, etc	15.50
Total	1,025.89

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ALLOTMENTS.

Allotments to June 12, 1902	$28, 860. 00
July 14, 1903	2, 300. 00
July 25, 1904	700. 00
July 3, 1905	1, 300. 00
July 10, 1906	1, 660. 00
July 6, 1907	1, 900. 00
July 17, 1908	1, 200. 00
July 10, 1909	1, 122. 87
Total	39, 042. 87

COMMERCIAL STATISTICS.

Statement showing traffic through lock and dam in Yamhill River, Oregon, during fiscal year ending June 30, 1910.

Data.	Lock open.	Lock closed.	Number lockages.	Freight carried through lock.	Passengers carried.
1909.	*Days.*	*Days.*		*Tons.*	*Number.*
July	31	.....	7	7½	36
August	31	.....	13	18	37
September	30	.....	4	.....	10
October	31	.....	7	.....	37
November	20	10	.....	.....	.....
December	16	15	.....	.....	.....
1910.					
January	17	14	.....	.....	.....
February	9	19	.....	.....	.....
March	23	8	3	127	3
April	28	2	5	.....	12
May	31	.....	22	223½	80
June	30	.....	9	.....	48
Total	297	68	70	376	263

V V 3.

IMPROVEMENT OF WILLAMETTE RIVER AT WILLAMETTE FALLS, OREGON.

For history of this work, see current summary of this report.

OPERATIONS DURING THE FISCAL YEAR 1910.

The general project was adopted by the river and harbor act approved June 25, 1910, and no work was done during the fiscal year.

APPROPRIATION.

June 25, 1910	$300, 000

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COMMERCIAL STATISTICS.

The canal and locks at Oregon City overcoming the falls of the Willamette River are owned and operated by the Portland Railway, Light and Power Company, and the following is a statement of the traffic passing through them during the calendar year 1909:

Grain	tons	2,319
Flour and mill stuff	do	1,521
Coal	do	88
Wool	do	98
General merchandise	do	6,636
Potatoes	do	836
Hops	do	913
Piling	linear feet	291,000
Lumber	feet b. m.	35,014
Logs	do	1,134,463
Cattle and horses	number	1,336
Sheep and hogs	do	78
Passengers	do	10,937

VV 4.

IMPROVEMENT OF COLUMBIA AND LOWER WILLAMETTE RIVERS BELOW PORTLAND, OREGON.

For history of this work, projects, and results accomplished, see current summary of this report.

OPERATIONS DURING THE FISCAL YEAR 1910.

Operations during the fiscal year have consisted entirely in dredging for maintenance of the channel between Portland and Astoria.

The dredge *Clatsop* worked throughout the year, except from May 7 to June 4, when she was laid up on account of repairs. A total of 1,509,490 cubic yards of material was excavated, increasing the depths over the different shoals from 2 to 4 feet. Details of the work done and results accomplished at the different localities are shown in tables Nos. 1 and 2 herewith.

The dredges *Columbia* and *Portland*, belonging to the port of Portland commission, were also operated in the main ship channel, the expense being borne by the commission. They report having excavated a total of 1,925,827 cubic yards from the shoals between Portland and Slaughters, and that the ruling depth obtained was 26 feet at mean low tide.

Considerable work was done at the moorings in repairing and maintaining the floating plant belonging to the district. A new pattern house was constructed to increase the storage facilities. The U. S. dredge *Ladd* and tug *Lincoln* were condemned and sold.

The usual low-water surveys were made after the summer freshet had subsided, for the purpose of determining the lines for dredging. These surveys were made in connection with a survey of the Columbia and lower Willamette rivers, with a view to securing a 30-foot channel, the project for which was called for by the act of March 3, 1909, and which is now being prepared.

The channel in the lower Columbia and Willamette rivers is gradually improving, so that in order to obtain the same depth less dredging is required each year. The port of Portland commission is systematically dredging to a greater depth each time they cut through the bars, and the river appears to adapt itself to the new depths, which do not seem to deteriorate any faster than the old ones. The

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same policy has been adopted on the work done by the U. S. dredge *Clatsop*, with the result that on several bars the depth has been increased considerably, compared with work done previous to this year.

A number of applications for permission to erect structures in the river were examined and acted upon.

In the opinion of the district officer, the Columbia and lower Willamette rivers from Portland to the sea are worthy of further improvement.

TABLE No. 1.—*Work done by dredge Clatsop during fiscal year ending June 30, 1910.*

Location.	Period at work.	Days working.	Hours pumping.	Material moved.	Depths.	
					Before.	After.
				Cubic yards.		
Upper sands	July 1, 1909, to Aug. 31.	42	270	197,897	21½	23
Taylor Sands					20	23½
Do	May 1 to 7, June 4 to 30.	26	178	118,914	20	21
No. 2 Beacon bar	Sept. 1 to 30.	21	146	149,790	20½	23½
Pillar Rock bar	Oct. 1 to Nov. 30.	42	268	377,418	20½	26
Harrington Point bar	Dec. 1 to 31, Jan. 1 to 31.	42	325	237,195	20	24
Puget Island bar	Feb. 1 to 28.	18	139	124,844	22	26
Coffee Island bar	Mar. 1 to 31.	23	160	161,045	25	28
No. 1 Beacon bar	Apr. 1 to 30.	22	136	142,387	22	24
Total		235	1,612	1,509,490		

The period from May 7 to June 4 was occupied in making extensive repairs.

TABLE No. 2.—*Cost of dredging by the U. S. dredge Clatsop, including operating expenses, wages, subsistence, fuel, etc.*

Amount of material moved		1,509,490
Operating expenses, wages, subsistence, current repairs, etc		$33,136.36
Black Diamond coal, 82 1414/2000 tons, at $5.90	$489.29	
Richmond coal, 192 1740/2000 tons, at $6.65	1,282.08	
Carbonado coal, 676 221/2000 tons, at $5.90	3,990.98	
Aberdare coal, 3,734 1918/2000 tons, at $6.65	24,836.76	
		30,599.10
Total cost of operating		63,735.46

Cost per cubic yard for the fiscal year, $0.04222.
Cost per cubic yard for coal, fiscal year, $0.02027.
Coal consumed per cubic yard, 6.96 pounds.
Cubic yards dredged per ton of coal, 322.
Cubic yards per day's dredging, 6,423.

Total amount of material moved by the dredge since her construction in 1909:

	Cubic yards.
Total to close of fiscal year ending June 30, 1909	16,504
Amount dredged during the fiscal year, 1910	1,509,490
Total	1,525,994

Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912, for maintenance of improvement [a] $150,000

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

[a] Exclusive of the balance unexpended July 1, 1910.

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APPROPRIATIONS.

Appropriated prior to adoption of the present project (see H. Doc. No. 421, 57th Cong., 2d sess.)	$1,330,365.00
June 13, 1902	225,000.00
April 28, 1904 (allotted June 4, 1904)	15,000.00
March 3, 1905	100,000.00
June 30, 1906	125,000.00
March 2, 1907	300,000.00
March 3, 1909 (allotted Mar. 31, 1909)	100,000.00
June 25, 1910	175,000.00
Receipts from sales	4,452.97
Total	2,374,817.97

CONTRACTS IN FORCE.

Emergency:
Name of contractor: Geo. W. Sanborn, Astoria, Oreg.
Date of contract: June 25, 1909.
Character: Furnishing and delivering coal.
Quantity: Approximately 2,000 tons.
Prices: $6.65 per ton of 2,240 pounds for "Richmond lump";
6.65 per ton of 2,240 pounds for "Hebburn";
6.65 per ton of 2,240 pounds for "Aberdare";
5.90 per ton of 2,240 pounds for "Carbonado" steam;
5.90 per ton of 2,240 pounds for "Roslyn" special steam.
Approved: Contract authorized by Chief of Engineers, June 16, 1909.
Date of beginning: July 1, 1909.
Date of expiration: June 30, 1910.

Lease:
Name of lessor: F. P. Kendall, Portland, Oreg.
Date of lease: July 31, 1909.
Character: Hire and lease of portion of "Holly Rood" dock, Astoria, Oreg.
Price: $15 per month.
Approved: July 26, 1909.
Date of beginning: August 1, 1909.
Date of expiration: July 31, 1912.

Lease:
Name of lessor: M. C. Banfield, Portland, Oreg.
Date of lease: November 9, 1909.
Character: Hire and lease of portion of "Central" dock, Portland, Oreg.
Price: $30 per month.
Approved: November 20, 1909.
Date of beginning: November 10, 1909.
Date of expiration: December 9, 1909.

COMMERCIAL STATISTICS.

Vessel classification.

DEEP-SEA CRAFT.

Class.	American.	Foreign.	Total.	Net registered tonnage.	Passengers.
Registered:					
Steamers	1	100	101	310,867	0
Sailing	12	85	97	151,045	0
Unregistered (licensed and enrolled):					
Steamers	1,835	.....	1,835	2,270,057	(a)
Sailing	80	.....	80	53,673	(a)
Rafts	6	.....	6	.....	.....
Total	1,934	185	[b]2,119	2,815,642	.....

[a] No record. [b] Arrivals and clearances, irrespective of number of vessels.

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Vessel classification—Continued.

RIVER CRAFT.

Class.	American.	Foreign.	Total.	Net registered tonnage.	Passengers.
Licensed and enrolled steamers	94	.....	a 94	17,283	306,826

a Number of river vessels in the trade.

Freight traffic.

Articles.	Amount, in customary units.	Amount, in short tons.	Valuation.	Rate per ton, mile.
Exports and imports.				*Mills.*
Bags and burlap	6,917 tons	6,917	$553,360	0.694
Barley	470,520 bushels	11,763	245,067	.428
Cement	95,440 barrels	19,088	229,056	.122
Coal	8,289 tons	8,289	41,445	.694
Coke	5,627 tons	5,627	28,135	.308
Flour	350,390 barrels	35,039	2,102,340	.638
Fibers	3,016 tons	3,016	241,280	.793
Fire brick and clay	5,739 tons	5,739	114,780	.191
Iron	5,321 tons	5,321	106,420	.184
Lumber	90,148,000 feet b. m	150,296	1,352,220	.62
Machinery	63 tons	63	2,803	.694
Miscellaneous	1,756 tons	1,756	121,298	.694
Rice	2,998 tons	2,998	239,840	.851
Sulphur	4,739 tons	4,739	66,346	.638
Wheat	5,664,500 bushels	169,935	5,671,167	.421
Total		430,586	11,015,617	
Domestic.				
Lumber	259,811,000 feet b. m	374,643	3,897,165	3.31
Logs	36,000,000 feet b. m	72,000	288,000	1.50
Oil, crude	1,599,420 barrels	319,884	959,652	2.50
Miscellaneous	400,674 tons	400,674	24,040,440	5.00
Total		1,167,201	29,185,257	
Local.				
Cattle and horses	14,862 head	7,431	1,114,650	40.00
Coal	3,016 tons	3,016	21,112	20.00
Fish	23,806 tons	23,806	2,856,720	20.00
Flour	151,680 barrels	15,168	910,080	20.00
Fruit	4,850 tons	4,850	291,000	40.00
General merchandise	129,673 tons	129,673	12,967,300	50.00
Hay	16,971 tons	16,971	254,565	20.00
Hops	114 tons	114	22,800	50.00
Logs (towed)	924,335,000 feet b. m	1,386,503	7,394,680	5.00
Lumber	17,687,000 feet b. m	26,530	265,300	20.00
Miscellaneous	64,371 tons	64,371	3,862,260	50.00
Oil	918,665 barrels	183,733	551,199	30.00
Piles (towed)	1,643,730 linear feet	29,586	119,544	12.50
Potatoes	34,284,000 pounds	17,142	342,840	30.00
Railroad iron	5,370 tons	5,370	187,950	25.00
Sand and gravel (barged)	187,470 cubic yards	281,206	281,206	8.00
Sheep and hogs	13,286 head	996	174,300	28.00
Shingles	759,900 bundles	12,665	379,950	28.00
Stone (barged)	412,752 cubic yards	619,128	619,128	10.00
Wheat	327,066 bushels	9,812	245,300	25.00
Other cereals	12,003 tons	12,003	240,060	25.00
Wood (barged)	9,522 cords	14,283	35,707	15.00
Wool	564 tons	564	124,080	50.00
Total		2,865,221	33,261,731	
RECAPITULATION.				
Exports and imports		430,586	11,015,617	
Domestic		1,167,201	29,185,257	
Local		2,865,221	33,261,731	
Grand total		4,463,008	73,462,605	

Average haul over portion of rivers under improvement, 100 miles. Total average haul, rivers and oceans, exports and imports, 8,000 miles; domestic, 800 miles; local, 100 miles.

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V V 5.

IMPROVEMENT OF THE MOUTH OF COLUMBIA RIVER, OREGON AND WASHINGTON.

For history of this work, projects, and results accomplished see current summary of this report.

OPERATIONS DURING FISCAL YEAR 1910.

At the beginning of the present fiscal year the jetty tracks had been rebuilt to station 315+22, bent 1838, and extended from there to station 333+76, bent 1941.

The enrockment between stations 210+00 and 324+40 had been raised to a height of from 5 to 8 feet above mean low tide.

During the first half of the fiscal year the tramway was extended from station 333+76, bent 1941, to station 339+88, bent 1975.

On November 29, 1909, 41 bents, station 332+50, bent 1934, to station 339+88, bent 1975, were destroyed by storm. On the resumption of work in the spring these 41 bents were rebuilt and several attempts were made to extend the trestle seaward, but up to the end of the fiscal year only 4 bents of extension have been built, making the end of trestle at station 340+60, bent 1979.

Besides this 472 piles were driven to strengthen the jetty in that portion built in previous years.

During the year 603,289 tons of stone were received under contract and were used in raising the enrockment over the older portions of the jetty and in extending it out as the tramway was rebuilt and advanced. The delivery of stone has been regular, but the quantity has not been sufficient to push the jetty out rapidly.

The enrockment was extended from station 324+40, bent 1889, to station 337+18, bent 1960, a distance of 1,278 feet. A large proportion of the stone received during the fiscal year was used in raising the enrockment between station 279+94, bent 1642, and station 324+40, bent 1889, which accounts for the comparatively small advance beyond the end of the previous year's work. As the jetty increases in length the amount of stone required on the portion previously constructed increases on account of the impossibility of filling out the slopes to their normal condition. The slopes are flattened out by the action of the seas during storms and the crest of the jetty is lowered, requiring a new supply of stone to replace that drawn away to the slopes. This movement of stone from the center to the slopes appears to last during about two seasons after the enrockment is first built, little lowering of the enrockment taking place after that period.

The winter of 1909–10 was the most stormy experienced for many years, but the only loss of trestle resulting was that of the portion which extended out beyond the finished enrockment between stations 332+50, bent 1934, and 339+88, bent 1975, which was built for the purpose of placing an apron in advance. This was replaced and extended on the resumption of operations in the spring. Owing, however, to belated storms its extension was delayed until the end of June, notwithstanding several attempts to advance, each one of which only led to the destruction of the new extension.

The tracks have required much work of maintenance on account of the destructive forces during the winter months, which tend to

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disturb the trestle and cause great deterioration through rust of the steel in the tracks.

All machine work required for repairs to plant was done in the shops at Fort Stevens.

The bar survey of 1909 showed the opening through the bar, between 24-foot contours, to be 4,700 feet wide, with the exception of a few lumps which had only 23½ feet of water over them. There was a well-defined channel through this opening, with a width of 500 feet and a depth of 26½ feet, connecting the deep water inside the bar with deep water outside.

The survey of 1910 shows that the opening through the bar, between 24-foot contours, has increased to a width of 8,000 feet, over practically all of which area there is a least depth of 25 feet, with the exception of two lumps. There are several channels connecting deep water inside the bar with deep water outside the bar within this area, the principal one of which has a minimum depth of 26½ feet and a width of 1,000 feet. A map of the survey of 1910 is transmitted herewith, also a map showing the comparative 24-foot contours in 1900, 1909, and 1910.

The conditions at Peacock Spit are about as usually found, with slight changes in depths and a gradual movement to the west of the outer 24-foot contour. The southwesterly end of Peacock Spit has been cut away so that the 24-foot contour there has moved northward about 5,000 feet.

Clatsop Spit at its 24-foot contour, on the north side of the jetty, shows an advance of about 1,000 feet toward the channel at a point opposite Sand Island, and a recession of about 800 feet toward the jetty farther out. The 30-foot contour of Clatsop Spit, on the north side of the jetty, has advanced seaward about 4,000 feet. On the west end Clatsop Spit has advanced seaward about 2,000 feet, filling the 26½-foot channel shown by last year's survey. The 24-foot contour on the south side of the jetty has receded toward the jetty.

There are, no doubt, extensive deposits of sand along both sides of the jetty for about a mile out from the high-water shore of Clatsop Spit, where no soundings were taken. While the results of the survey are very satisfactory as showing the tremendous scouring effect of the jetty, and on account of the widening of the deep-water area and of the channel, yet it is somewhat disappointing that all of this force was expended in widening the opening between the 24-foot contours rather than in cutting a deeper channel from deep water inside the bar to deep water outside.

The developments shown by the survey indicate the advisability of beginning the construction of the north jetty, as there seems to be no doubt that a further concentration of the scouring force would naturally deepen the channel across the bar, while the extension of the south jetty to its full projected length may cause the breaking out of another channel to the north, and a consequent deterioration of the present channel. Another argument for the commencement of the north jetty is that, owing to greater depths and exposure to the violence of heavy seas which are rapidly increasing as the jetty is continued out, the extension of the south jetty is becoming not only very costly but also extremely difficult. Indeed, it is not an assured fact that the extension can be carried to its projected limit except at a cost that would be almost prohibitive. Depths up to 65 feet at

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mean low tide have already been encountered, and while these depths are unusual, yet the normal depth to which the base of the enrockment now sinks can not be much less than 55 feet below mean low tide, and will probably increase farther out.

Larger blocks of stone than are now being received, or blocks of concrete, will probably be required for the outer end of the jetty, and should be placed during the seasons of 1911 and 1912, the first half (1911) being devoted to such extension and repairs as may be considered desirable. The work of preparation for the construction of the north jetty could be carried along at the same time, making it possible to commence work on it during the season of 1912.

A contract was made, under date of January 6, 1910, with the Marine Iron Works, of Portland, for making certain alterations and repairs to the seagoing dredge *Chinook*. The work includes the thorough overhauling of boiler equipment, entire removal of hurricane deck, saloon deck, and most of the spar deck, lowering all pumping machinery, pipes, fittings, etc., materially reducing the draft.

The work of making these changes was commenced as soon as the contract was approved, and has progressed to a point where it is estimated only about 10 per cent of the work remains to be completed. The contract should be finished and the work of dredging commenced on the bar by the middle of August.

In the opinion of the district officer, the mouth of the Columbia River is worthy of further improvement to the extent of carrying out the present project.

Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912:		
For works of improvement	$850,000	
For maintenance of improvement	100,000	
		[a] $950,000

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

Appropriated prior to adoption of the present project (see H. Doc. No. 421, 57th Cong., 2d sess.)	$2,043,180.00
Less amount transferred by act of June 3, 1896, to improvement below Tongue Point	50,000.00
	1,993,180.00
June 6, 1900	250,000.00
June 13, 1902	500,000.00
March 3, 1903	1,000,000.00
March 3, 1905	400,000.00
April 23, 1906	400,000.00
June 30, 1906	300,000.00
March 2, 1907	750,244.00
May 27, 1908	1,450,000.00
March 3, 1909 (allotted Apr. 20, 1909)	700,000.00
March 4, 1909	250,000.00
June 25, 1910	1,200,000.00
Receipts from sales	1,575.14
Total	9,194,999.14

[a] Exclusive of the balance unexpended July 1, 1910.

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CONTRACTS IN FORCE.

Formal:
Name of contractor: Columbia Contract Company, Portland, Oreg.
Date of contract: July 13, 1907.
Character: Furnishing and delivering stone.
Quantities and prices:
200,000 tons foundation stone, at $1.10 per ton of 2,000 pounds.
1,000,000 tons jetty stone, at $1.12 per ton of 2,000 pounds.
Approved: September 5, 1907.
Date of beginning: Ten days after date of notification of approval of contract.
Date of expiration: Beginning with working season of 1908, foundation stone to be delivered at rate of approximately 1,000 tons per working day and jetty stone at rate of approximately 1,500 tons per working day for first thirty days after date of notification of approval of contract, and at rate of approximately 3,000 tons per working day thereafter until contract has been completed. Final payment made November 19, 1909.

Formal:
Name of contractor: Columbia Contract Company, Portland, Oreg.
Date of contract: October 21, 1909.
Character: Furnishing and delivering stone.
Quantity: 380,000 tons, more or less.
Price: $1.12 per ton of 2,000 pounds.
Approved: November 18, 1909.
Date of beginning: Ten days after date of notification of approval of contract.
Date of expiration: One hundred and twenty working days from date of beginning, it being understood that only such days as the work of receiving jetty stone is carried on are to be counted as working days.

Formal:
Name of contractor: The Marine Iron Works, Portland, Oreg.
Date of contract: January 6, 1910.
Character: Repairs, alterations, and additions to U. S. dredge *Chinook*.
Price: $132,000.
Approved: January 18, 1910.
Date of beginning: Fifteen days after date of notification of approval.
Date of expiration: Four months and fifteen days from date of notification of approval.
Supplemental agreement to above, dated February 9, 1910, approved by Assistant Secretary of War March 15, 1910, provides for certain modifications to paragraph 87 of specifications covered by agreement dated January 6, 1910, and in consideration of increased cost to the contractor, caused by said modifications, he shall be paid $5,075 in addition to the amount named above.

Emergency:
Name of contractor: Geo. W. Sanborn, Astoria, Oreg.
Date of contract: June 25, 1909.
Character: Furnishing and delivering coal.
Quantity: Approximately 4,200 tons.
Price: $5.80 per ton of 2,240 pounds.
Approved: Contract authorized by Chief of Engineers June 16, 1909.
Date of beginning: July 1, 1909.
Date of expiration: June 30, 1910.

Lease:
Name of lessee: John Service, Astoria, Oreg.
Date of lease: April 15, 1908.
Character: Lease of certain parcel of United States land on Sand Island, at mouth of Columbia River, Oregon and Washington.
Price: $1,450 per annum.
Approved by Assistant Secretary of War, June 8, 1908.
Date of beginning: May 1, 1908.
Date of expiration: April 30, 1911.

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Lease:
Name of lessee: Chris Hansen, Chinook, Wash.
Date of lease: April 16, 1908.
Character: Lease of certain parcel of United States land on Sand Island, at mouth of Columbia River, Oregon and Washington.
Price: $150 per annum.
Approved by Assistant Secretary of War, June 3, 1908.
Date of beginning: May 1, 1908.
Date of expiration: April 30, 1911.

Lease:
Name of lessee: Columbia River Packers Association, Astoria, Oreg.
Date of lease: May 1, 1908.
Character: Lease of certain parcel of United States land on Sand Island, at mouth of Columbia River, Oregon and Washington.
Price: $5,175 per annum.
Approved by Assistant Secretary of War, June 3, 1908.
Date of beginning: May 1, 1908.
Date of expiration: April 30, 1911.

COMMERCIAL STATISTICS.

Vessel classification.

Class.	American.	Foreign.	Total.	Net registered tonnage.	Passengers.
Registered:					
Steamers	1	100	101	310,867	0
Sailing	12	85	97	181,045	0
Unregistered (licensed and enrolled):					
Steamers	1,835	.....	1,835	2,270,057	(a)
Sailing	80	.....	80	53,673	(a)
Rafts	6	.....	6	.....	.....
Total	1,934	185	[b] 2,119	2,815,642	.....

[a] No record. [b] Arrivals and clearances, irrespective of number of vessels.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Valuation.	Rate per ton mile.
Exports and imports.				*Mills.*
Bags and burlap	6,917 tons	6,917	$553,360	0.694
Barley	470,520 bushels	11,763	245,067	.428
Cement	95,440 barrels	19,088	229,056	.122
Coal	8,289 tons	8,289	41,445	.694
Coke	5,627 tons	5,627	28,135	.306
Flour	350,390 barrels	35,039	2,102,340	.638
Fibers	3,016 tons	3,016	241,280	.793
Fire brick and clay	5,739 tons	5,739	114,780	.191
Iron	5,321 tons	5,321	106,420	.184
Lumber	90,148,000 feet b. m	150,296	1,352,220	.62
Machinery	63 tons	63	2,863	.694
Miscellaneous	1,756 tons	1,756	121,208	.694
Rice	2,998 tons	2,998	239,840	.851
Sulphur	4,739 tons	4,739	66,346	.638
Wheat	5,664,500 bushels	169,935	5,571,167	.421
Total	.....	430,586	11,015,617	
Domestic.				
Lumber	259,811,000 feet b. m	874,643	3,897,165	3.31
Logs	36,000,000 feet b. m	72,000	288,000	1.50
Oil, crude	1,599,420 barrels	319,884	959,652	2.50
Miscellaneous	400,674 tons	400,674	24,040,440	5.00
Total	.....	1,167,201	29,185,257	
Grand total	.....	1,597,787	40,200,874	

Average haul over portion of river under improvement, 7½ miles; exports and imports, foreign traffic, 8,000 miles; domestic coastwise traffic, 800 miles.

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V V 6.

IMPROVEMENT OF CLATSKANIE RIVER, OREGON.

For history of this work, projects, and results accomplished, see current summary of this report.

OPERATIONS DURING THE FISCAL YEAR 1910.

No work was done on the Clatskanie River during the fiscal year, there being no funds available.

The new cut across a bend in the channel near the mouth of the river was completed during the year by the Columbia Agricultural Company, of Portland, Oreg., and the river, from the upper end of the cut to below the railroad bridge, was dredged to a depth of 6 feet below low water.

The work was done under a permit dated January 5, 1909, in connection with the reclamation of some of the low, marshy land adjacent to the river, the dredged material being used in constructing levees.

The cut, which is approximately 1,000 feet long, with a depth of 6 feet at low water, and a bottom width of not less than 40 feet, is to be deeded to the United States in accordance with the provisions of the above-mentioned permit.

In the opinion of the district officer, the Clatskanie River is worthy of improvement to the extent of dredging a 6-foot channel from Clatskanie to the railroad bridge, and of maintaining this channel, and the channel obtained by the Columbia Agricultural Company between the railroad bridge and the mouth.

Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912, for maintenance of improvement ..... [a] $1,000

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

March 3, 1899	$13,000
June 25, 1910	5,200
Total	[b] 18,200

COMMERCIAL STATISTICS.

Vessel classification.

Class.	American.	Net registered tonnage.	Passengers.
Unregistered licensed and enrolled river steamers	[c] 13	2,137	271

[a] Exclusive of the balance unexpended July 1, 1910.
[b] Of this amount, $324.53 was returned to the Treasury.
[c] Number of vessels in the trade.

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Freight traffic.

Articles.	Amount, in customary units.	Amount, in short tons.	Valuation.	Rate per ton-mile.
Cattle and horses	122 head	61	$9,150	$0.055
Coal	3 tons	3	21	.0285
Flour	2,400 barrels	240	144,000	.0285
Fruit	30 tons	30	2,340	.055
General merchandise	1,293 tons	1,293	129,300	.071
Hay	45 tons	45	675	.03
Hops	3 tons	3	600	.055
Logs (towed)	31,816,000 feet b. m.	47,724	254,528	.0055
Lumber	1,333 feet b. m.	2	20	.02
Oil	3,585 barrels	717	2,151	.043
Piles (towed)	440,000 linear feet	8,000	32,000	.008
Potatoes	54,000 pounds	27	540	.03
Sand and gravel	19 cubic yards	29	29	.035
Sheep and hogs	26 head	2	350	.037
Shingles	79,260 bundles	1,321	39,630	.033
Wheat	3,500 bushels	105	2,625	.03
Other cereals	315 tons	315	6,300	.03
Wool	1 ton	1	220	.055
Total		50,927	624,479	

Average haul over portion of river under improvement, 2 miles; total average haul on rivers, 70 miles.

V V 7.

IMPROVEMENT OF COWLITZ AND LEWIS RIVERS, WASHINGTON.

For history of these works, projects, and results accomplished, see current summary, page 962.

(A) OPERATIONS DURING THE FISCAL YEAR 1910 FOR COWLITZ RIVER, WASHINGTON.

Work on the Cowlitz River during the fiscal year consisted in removing 24 snags and clearing driftwood jams from the channel between the mouth and Castle Rock. The work was done during the month of November by the U. S. snag boat *Mathloma*.

Sufficient funds were not available for extended work until the passage of the act of June 25, 1910. With the funds made available, it is proposed to prosecute the work under the approved project during the coming season, and it is the opinion of the district officer that the stream is worthy of improvement to the extent of completing the project and maintaining the depth obtained thereby.

Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912, for maintenance of improvement ..... [a]$6,000

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

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[a] Exclusive of the balance unexpended July 1, 1910.

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APPROPRIATIONS.

Appropriated to June 13, 1902 (see H. Doc. No. 421, 57th Cong., 2d sess.)	$35,750
March 3, 1905 (allotted Apr. 7, 1905)	4,400
March 2, 1907 (allotted May 1, 1907)	12,500
June 25, 1910 (allotted Aug. 4, 1910)	31,600
Total	84,250

COMMERCIAL STATISTICS.

Vessel classification.

Class.	American.	Net registered tonnage.	Passengers.
Unregistered licensed and enrolled river steamers	a 14	2,344	14,100

a Number of vessels in the trade.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Valuation.	Rate per ton-mile
Cattle and horses	450 head	225	$33,750	$0.08
Cereals	1,350 tons	1,350	27,000	.08
Coal	50 tons	50	350	.08
Fish	500 tons	500	60,000	.05
Flour	40,000 barrels	4,000	240,000	.04
Fruit	280 tons	280	16,800	.05
General merchandise	7,500 tons	7,500	750,000	.045
Hay	5,500 tons	5,500	82,500	.035
Hops	110 tons	110	22,000	.055
Logs (towed)	159,732,000 feet b. m.	239,598	1,277,856	.0023
Lumber	2,000,000 feet b. m.	3,000	30,000	.025
Oil	300 barrels	60	180	.07
Piles (towed)	341,000 linear feet	6,200	24,800	.0125
Potatoes	8,000,000 pounds	4,000	80,000	.035
Sand and gravel	133 cubic yards	200	200	.006
Sheep and hogs	2,800 head	210	36,750	.04
Shingles	472,500 bundles	7,875	236,250	.045
Wool	3 tons	3	660	.06
Total		280,661	2,919,096	

Average haul on portion of river under improvement, 20 miles; total average haul on rivers, 65 miles.

(B) OPERATIONS DURING THE FISCAL YEAR 1910 FOR LEWIS RIVER, WASHINGTON.

Operations were carried on from November 24 to December 9 with the U. S. snag boat *Mathloma*, and consisted in snagging the channel and clearing the overhanging trees and brush from the banks of the main river to the forks and on the North Fork to Hays Landing.

The following is a summary of the work done:

Snags removed from channel by boat	number	88
Snags and trees cut from bank	do	103
Distance moved	miles	146
Fuel consumed (wood)	cords	33

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The work contemplated with available funds is the redredging of shoals and snagging to restore the channel and obtain a navigable depth for the light-draft boats plying the stream. This work is essential for bettering the conditions, and, in the opinion of the district officer, the stream is worthy of improvement to the extent of expending a limited amount each year for maintenance.

Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912, for maintenance of improvement ..... [a]$2,500
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

Appropriated to June 13, 1902 (see H. Doc. No. 421, 57th Cong., 2d sess.)	$14,750
March 3, 1905 (allotted Apr. 7, 1905)	5,600
March 2, 1907 (allotted May 1, 1907)	2,500
June 25, 1910 (allotted Aug. 4, 1910)	2,500
Total	25,350

COMMERCIAL STATISTICS.

Vessel classification.

Class.	American.	Net registered tonnage.	Passengers.
Unregistered licensed and enrolled river steamers	[a]12	2,189	14,000

[a] Number of vessels in the trade.

Freight traffic.

Articles.	Amount, in customary units.	Amount in short tons.	Valuation.	Rate per ton-mile.
Cattle and horses	1,642 head	821	$123,150	$0.10
Fish	193 tons	193	23,160	.10
General merchandise	7,896 tons	7,896	789,600	.10
Hay	1,615 tons	1,615	24,225	.0375
Logs (towed)	105,596,000 feet b. m.	158,394	844,764	.0082
Lumber	159,000 feet b. m.	239	2,390	.033
Oil	475 barrels	95	285	.0025
Piles (towed)	88,000 linear feet	1,600	6,400	.01
Potatoes	9,790,000 pounds	4,895	97,900	.05
Sheep and hogs	1,690 head	127	22,225	.006
Wheat	62,167 bushels	1,865	46,625	.0375
Wool	38 tons	38	3,360	.10
Total		177,778	1,989,084	

Average haul on portion of river under improvement, 20 miles; total average haul on rivers, 65 miles.

[a] Exclusive of the balance unexpended July 1, 1910.

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V V 8.

IMPROVEMENT OF GRAYS RIVER, WASHINGTON.

For history of this work, project, and results accomplished, reference is invited to current summary, page 966.

OPERATIONS DURING THE FISCAL YEAR 1910.

No work was carried on during the fiscal year, as sufficient funds were not available. The previous season's work left a channel of about 8 feet at low water to the head of navigation, but the winter freshets have caused further shoaling and also deposited snags and logs which will necessitate further work of scraping bars and snagging to restore the channel to that depth.

In the opinion of the district officer, the stream is worthy of improvement to the extent of maintaining a depth of about 8 feet at low water.

Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912, for maintenance of improvement	[a] $500
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

APPROPRIATIONS.

March 2, 1907	$2,500
June 25, 1910	500
Total	3,000

COMMERCIAL STATISTICS.

Vessel classification.

Class.	American.	Net registered tonnage.	Passengers.
Unregistered, licensed, and enrolled river steamers	[b] 3	1,003	5,000

[a] Exclusive of the balance unexpended July 1, 1910.
[b] Number of vessels in the trade.

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Freight traffic.

Articles.	Amount, in customary units.	Amount, in short tons.	Valuation.	Rate per ton-mile.
Cattle and horses	100 head	50	$7,500	$0.04
Cereals	200 tons	200	4,000	.03
Coal	10 tons	10	70	.02
Fish	15 tons	15	1,800	.02
Flour	1,000 barrels	100	6,000	.02
Fruit	5 tons	5	300	.03
General merchandise	100 tons	100	10,000	.05
Hay	75 tons	75	1,125	.02
Logs (towed)	15,186,000 feet b. m	30,373	136,674	.005
Lumber	333,000 feet b. m	500	5,000	.02
Miscellaneous	10 tons	10	600	.05
Oil	75 barrels	15	45	.03
Potatoes	200,000 pounds	100	2,000	.03
Railroad iron	590 tons	590	20,650	.02
Sand and gravel	17 cubic yards	25	25	.02
Sheep and hogs	1,000 head	75	13,125	.03
Shingles	42,000 bundles	700	21,000	.02
Wheat	2,500 bushels	75	1,875	.02
Wood	500 cords	750	1,875	.02
Total		33,768	233,664	

Average haul on portion of river under improvement, 8 miles; total average haul on rivers, 52 miles.

V V 9.

GAUGING WATERS OF COLUMBIA RIVER, OREGON.

OPERATIONS DURING THE FISCAL YEAR 1910.

A self-registering tide gauge at Fort Stevens, Oreg., has been in operation during the fiscal year, and daily bulletins of the gauge readings have been kept for the information of persons interested in navigation of the Columbia River.

A tide gauge was also maintained in the Columbia River, near the mouth of the Willamette, and daily record of the readings kept.

In view of the importance of these gauge readings as a benefit to pilots and others, the keeping of the records is considered a worthy object.

The amount expended during the year was for the hire of gauge keepers.

Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912, for maintenance of improvement ..... * $1,000

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

Total amount appropriated to June 13, 1902 (see H. Doc. No. 421, 57th Cong., 2d sess.)	$9,000
March 3, 1905	1,000
June 25, 1910	1,000
Total	11,000

* Exclusive of the balance unexpended July 1, 1910.

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APPENDIX W W.

IMPROVEMENT OF RIVERS AND HARBORS IN THE SEATTLE, WASHINGTON DISTRICT.

REPORT OF MAJ. C. W. KUTZ, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1910.

IMPROVEMENTS.

1. Willapa River and Harbor, Washington.
2. Grays Harbor and bar entrance, Washington.
3. Grays Harbor, inner portion, between Aberdeen and the entrance to said harbor, and Chehalis River, Washington.
4. Puget Sound and its tributary waters, Washington.
5. Inspection of fish traps, etc., Puget Sound, Washington.
6. Harbor at Olympia, Washington.
7. Hammersley Inlet, Washington.
8. Tacoma Harbor, Washington.
9. Waterway connecting Puget Sound with lakes Union and Washington, Washington.
10. Everett Harbor, Washington.
11. Snohomish River, Washington.
12. Skagit River, Washington.
13. Swinomish Slough, Washington.
14. New Whatcom (Bellingham) Harbor, Washington.
15. Columbia River between Wenatchee and Bridgeport, Washington.
16. Columbia River, Bridgeport to Kettle Falls, Washington.
17. Okanogan and Pend Oreille rivers, Washington.
18. Polson Bay, Flathead Lake, Montana.
19. St. Michael Canal, Alaska.

UNITED STATES ENGINEER OFFICE,
Seattle, Wash., July 15, 1910.

SIR: I have the honor to forward herewith annual report of the river and harbor works in my charge for the fiscal year ending June 30, 1910.

Very respectfully,

C. W. KUTZ,
Major, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

W W 1.

IMPROVEMENT OF WILLAPA RIVER AND HARBOR, WASHINGTON.

There were no operations during the year.

The expenditures during the year were for inspections, establishment of pier head lines and investigation of complaints relative to obstructions to navigation.

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Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912, for works of improvement ..... [a] $168,132.20
Submitted in compliance with requirements of sundry civil act of June 4, 1897.

APPROPRIATIONS.

Total appropriations to December 31, 1902 (p. 825, H. Doc. No. 421, 57th Cong., 2d sess.)	$36,350
Act of March 2, 1907	25,000
Act of June 25, 1910	50,000
Received from sales	12
Total	111,362

COMMERCIAL STATISTICS, 1909.

Freight traffic.

Article.	Amount.	Short tons.	Value.
Box shooks	2,250,000 feet b. m	3,375	$36,000
Cement		170	2,047
Grain		40	1,120
Groceries		200	10,000
Hardware		100	5,000
Hay		150	2,000
Lath	20,575,450 pieces	5,144	30,862
Logs	141,036,055 feet b. m	212,704½	1,278,315
Lumber	133,883,691 feet b. m.	200,824½	14,650,712
Machinery		35	2,684
Miscellaneous		1,894	65,140
Piles	85,000 linear feet	2,137½	6,000
Shingles	51,463,750 pieces	4,889	92,633
Sugar		40	4,600
Shell fish		800½	107,683
Total		433,513	16,294,777

W W 2.

IMPROVEMENT OF GRAYS HARBOR AND BAR ENTRANCE, WASHINGTON.

Operations consisted of placing stone in the jetty and work incidental thereto.

The contractors commenced delivery of stone on July 8, 1909, and suspended deliveries on September 18, 1909. The delivery of stone was resumed on April 21, 1910.

The following table shows the stone received during the year:

	Tons.
July, 1909 (8 barge loads)	12,710.410
August, 1909 (9 barge loads)	13,521.345
September, 1909 (5 barge loads)	7,510.875
April, 1910 (3 barge loads)	3,710.675
May, 1910 (8 barge loads)	11,446.928
June, 1910 (10 barge loads)	13,382.850
Total (43 barge loads)	62,283.083

[a] Exclusive of the balance unexpended July 1, 1910.

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The total quantity of stone delivered to date is 132,864.562 tons.

The cost of labor during this period was $21,228.91, all of which is a charge against the handling of stone, and amounts to about 34 cents per ton. The cost of supplies for engines, derricks, boilers, etc., was about 6 cents per ton. The total cost of unloading stone and placing it in the jetty was 40 cents per ton; the contract price for the stone delivered at the wharf is $1.55 per ton and the cost per ton in place in the jetty is $1.95.

In January, 1910, an examination of the piles in the receiving wharf showed that all spruce and fir piles had been badly eaten by the teredo and that the hemlock piles were sound. During February and March 160 hemlock piles were received and the greater number used to replace the affected ones. During this time repairs were made to the jetty trestle, which had been slightly damaged by drift during the winter. This consisted in replacing 35 piles and refastening others that had become loosened from the caps.

A survey of the channel in front of the receiving wharf made early in February showed that filling had taken place during the winter. The United States dredge *Oregon* was taken to the site on March 6–8 and was engaged in restoring the desired depths until April 23, on which date, having completed this work, she was returned to the work near Hoquiam. During this time 69,302 cubic yards of sand had been excavated, at a total cost in labor and supplies of $5,112.42; of which $3,467.75 was paid by the United States as the cost of restoring conditions existing at the time the contract was let, and $1,644.67 was paid by the stone contractor as the cost of securing a greater depth than originally existed.

A survey of the bar made by Lieut. Jos. H. Earle, Corps of Engineers, in May and June, 1910, showed that there had been a slight shoaling in the vicinity of the buoy system, but that two channels crossed the bar in a northwesterly direction with depths of 20 feet, though not used by the vessels entering and departing from Grays Harbor.

The spit north of the jetty had filled in so that the low-tide line of the ocean intersected the jetty 4,200 feet from the end, and for a great part of the distance from the high-water line to the low-water line the crest of the sands north of the jetty was very close to the ordinary high-water plane.

Great changes are taking place in the channels and shallows of the north spit, due apparently to the north jetty.

The crest of the enrockment has now been carried about 1½ feet above the mid-tide plane, to allow for a possible battering down by the waves, to a point about 1,000 feet from the end of jetty and to a point above the mid-tide plane within 500 feet of the end, which last-named point is 10,000 feet from the high-water line of the ocean. Thus nearly 1,000 feet more of jetty has been completed than called for by Colonel Chittenden's project, estimated at $600,000, at an actual expenditure of $505,486.95.

An estimate for the extension of this jetty for a distance of 7,000 feet was submitted, amounting to $1,030,000, and an appropriation of $75,000 was made by the act of June 25, 1910, for the purpose. With the funds available the jetty trestle will be extended 3,000 feet and sufficient rock placed to insure its stability.

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Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912, for works of improvement ..... [a] $400,000
Submitted in compliance with requirements of sundry civil act of June 4, 1897.

CONTRACTS IN FORCE.

Contractors: Independent Asphalt Paving Company and Northwestern Contract Company.
Character of work: Furnishing and delivering 250,000 tons of stone.
Price: $1.55 per ton of 2,000 pounds.
Date of contract: March 28, 1908.
Date of approval: May 5, 1908.
Date of commencement: May 18, 1908.
Date of completion: Indefinite.

APPROPRIATIONS.

Total appropriations to December 31, 1902 (p. 324, H. Doc. No. 421, 57th Cong., 2d sess.)	$1,000,000.00
March 3, 1905	30,000.00
March 2, 1907	200,000.00
May 27, 1908	300,000.00
March 3, 1909	100,000.00
June 25, 1910	75,000.00
	1,705,000.00
Received from sales	78.70
Total	1,705,078.70

COMMERCIAL STATISTICS, 1909.

Freight traffic.

Article.	Amount.	Short tons.	Value.
Brick	279,500 pieces	559	$10,0[illegible]
Box shooks	7,085,740 feet b. m.	10,627	77,[illegible]
Fruit		1,010	50
Lath	99,522,420 pieces	2,488	1[illegible]
Logs	314,024,323 feet b. m.	471,035	2[illegible]
Lumber	325,898,947 feet b. m.	488,848	
Miscellaneous		5,788	
Piling	139,637 linear feet	5,235	
Shingles	115,662,950 pieces	10,963	
Sugar		1,100	
Vegetables		576	
Total		998,355	

[a] Exclusive of the balance unexpended July 1, 1910.

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W W 3.

IMPROVEMENT OF GRAYS HARBOR (INNER PORTION) BETWEEN ABERDEEN AND THE ENTRANCE TO SAID HARBOR, AND CHEHALIS RIVER, WASHINGTON.

The dredge *Oregon* was transferred to this district on December 1, 1909, and arrived at Grays Harbor on December 6, 1909. Before the dredge could be put in commission it was necessary to make repairs to machinery and pontons. These repairs were completed on December 23, 1909, and dredging was commenced in the channel below Hoquiam on December 27. Considerable time was lost during January and February, 1910, on account of unfavorable weather conditions. During March and April, 1910, the dredge was operated in the vicinity of the receiving wharf at the jetty works on the north side of the harbor, in restoring and deepening the channel. From May 1 to June 17 dredging was done in the channel below Hoquiam, and completed on the last-named date. From June 18 to 30, 1910, dredging was done in the channel below Aberdeen.

The following quantities of material were excavated during the year:

	Cubic yards.
From channel in inner harbor	316,520
From channel at jetty wharf	96,580
Total	413,100

Total length of channel dredged in inner harbor, 21,250 feet.

The cost per cubic yard was:

At inner harbor	$0.0805
At jetty wharf	.058

Snagging was done in the Chehalis River, between the mouth of the river and Montesano, during September, 1909, with hired plant.

One hundred and thirty-seven snags were removed from the channel and 42 overhanging trees cut from the banks of the river.

Inner Grays Harbor and Chehalis River are considered worthy of improvement by the General Government to the extent of maintaining the depths contemplated by the existing project for inner Grays Harbor and obtaining the depths specified in the existing project for Chehalis River.

Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912, for works of improvement	[a] $10,000

Submitted in compliance with requirements of sundry civil act of June 4, 1897.

[a] Exclusive of the balance unexpended July 1, 1910.

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APPROPRIATIONS.

GRAYS HARBOR (INNER PORTION) BETWEEN ABERDEEN AND THE ENTRANCE TO SAID HARBOR, AND CHEHALIS RIVER, WASHINGTON.

Total appropriations to December 31, 1902 (p. 324, H. Doc. No. 421, 57th Cong., 2d sess.)	$125,000
Act of March 3, 1905	30,000
Act of March 2, 1907	177,000
Act of March 3, 1909 (allotment Apr. 23, 1909)	25,000
Act of June 25, 1910	32,500
Received from sales	27
Total	389,527

IMPROVEMENT OF CHEHALIS RIVER, WASHINGTON.

Total appropriations to December 31, 1902 (p. 324, H. Doc. No. 421, 57th Cong., 2d sess.)	$19,000

COMMERCIAL STATISTICS, 1909

Freight traffic.

Articles.	Amount.	Short tons.	Value.
Butter		330½	$165,250
Cement		1,882	22,584
Eggs	3,069 cases	69	25,047
Fruits and vegetables		7,340	286,360
Fish and oysters		424	35,400
Grain		1,453	43,590
Gravel		61,623	41,082
Coal		3,010	16,556
Horses and cattle	60 head	45	3,000
Logs	125,374,000 feet b. m	188,060	1,128,396
Lumber	914,000 feet b. m	1,371	10,054
Milk	524,250 gallons	2,097	73,395
Miscellaneous		14,318	1,431,800
Piling	21,500 linear feet	86	1,505
Sand	10,174 cubic yards	15,260	12,717
Shingles	902,500,000 pieces	85,737½	1,624,500
Total		383,106	4,921,235

WW 4.

IMPROVEMENT OF PUGET SOUND AND ITS TRIBUTARY WATERS, WASHINGTON.

During the year the snag boat was in commission eleven months and out of commission one month undergoing repairs and installing additional equipment.

A derrick with two booms, a short one for snagging and a longer one for dredging, with hoisting engine and a 1-yard orange-peel dredge bucket were installed at a cost of $4,656. Repairs to the vessel were made at a cost of $1,091. With the additional equipment the usefulness of the snag boat was greatly increased.

Snagging was done on the Skagit, Snohomish, Snoqualmie, Stillaguamish, Nooksak, Puyallup, and Duwamish rivers and Swinomish Slough. Dredging was done in the Skagit and Stilaguamish rivers and Swinomish Slough.

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During February, 1910, 5,500 cubic yards of material were dredged from Swinomish Slough and unloaded at Fort Whitman where it was placed, as fill, in front of Battery Harrison. During May and June, 1910, the snag boat was engaged in dredging material from the bay at Fort Worden for use as fill in front of Battery Kinzie. During that time 9,200 cubic yards were placed in the fill.

To reduce the low-water flow through Hatt Slough, an outlet of the Stilaguamish River, a mattress sill was built at a cost of $2,607. Before the work was completely enrocked a freshet occurred and a breach of 70 feet was made around the right end of the sill. Some stone was placed on the bank to prevent further erosion. To produce the desired effect additional work on this mattress sill will be necessary.

To prevent deterioration of the South Fork of the Skagit River a mattress sill was constructed in the North Fork about 1 mile below its mouth. The sill is 400 feet long and composed of piles, brush, and stone. The object was to reduce the low-water flow through the North Fork and the desired result has been accomplished.

The cost of the work was $4,663. Some repairs will be necessary, and these can be made at an approximate cost of $200.

During November, 1909, three severe freshets occurred in the rivers of western Washington. In the Skagit River the flood reached a greater height than previously recorded and great damage was done to the lands between the mouth of the Snohomish River and Padilla Bay. Large quantities of drift were brought down all of the streams and the removal of obstructions to navigation required more than the usual amount of work by the snag boat.

Regulations to govern the floating of logs on the Snoqualmie, Snohomish, and Sammamish rivers were prescribed by the Secretary of War under authority of the act of Congress approved May 9, 1900.

The work covered by the project for improving Puget Sound and tributary waters is considered worthy of continuance by the General Government.

Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912, for works of improvement ..... [a] $20,000
Submitted in compliance with requirements of sundry civil act of June 4, 1897.

APPROPRIATIONS.

Total appropriations to December 31, 1902 (p. 325 H. Doc. No. 421, 57th Cong., 2d sess.)	$228,500.00
Allotment June 4, 1904 (act Apr. 28, 1904)	12,000.00
Act of March 3, 1905	20,000.00
Act of March 3, 1905 (allotment Dec. 17, 1906)	4,500.00
Act of March 2, 1907	75,000.00
Act of March 3, 1909 (allotment Apr. 10, 1909)	25,000.00
Act of June 25, 1910	100,000.00
Received from sales	383.95
Total	465,383.95

[a] Exclusive of the balance unexpended July 1, 1910.

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COMMERCIAL STATISTICS, 1909.

Freight traffic.

NOOKSAK RIVER.

Article.	Amount.	Short tons.	Value.
Shingle bolts	4,000 cords	4,000	$16,000

STILAGUAMISH RIVER.

Farm products		287	$19,973
Flour, grain		2,100	79,380
Groceries, etc.		202	15,000
Hardware and building material		174	32,615
Hay		410	8,200
Live stock		223	28,942
Logs	43,158,180 feet b. m.	22,787	136,425
Lumber	1,000,000 feet b. m.	1,500	11,000
Machinery		211	42,100
Miscellaneous merchandise		2,323	176,224
Piling	1,260 linear feet	50	115
Shingles	9,000,000 pieces	855	22,500
Shingle bolts	7,767 cords	7,767	3,050
Total		38,839	576,024

SNOQUALMIE RIVER.

Hay and grain		20	580
Hardware and building material		21	4,950
Logs	40,390,000 feet b. m.	60,085	363,510
Machinery		130	14,200
Milk		2,655	92,925
Miscellaneous merchandise		48	4,440
Total		62,959	480,605

DUWAMISH RIVER.

Brick	10,165,000 pieces	20,330	101,650
Coal		4,702	11,755
Logs	6,000,000 feet b. m.	9,000	54,000
Poles	100,000 linear feet	3,750	7,000
Shingles	2,000,000 pieces	190	3,600
Total		37,972	178,005

WW 5.

INSPECTIONS OF FISH TRAPS, ETC., PUGET SOUND, WASHINGTON.

All traps have been periodically inspected during construction, while in operation, and during removal to insure that the traps were built according to approved plans, that proper lights and fog signals were maintained on them, and that broken-off or submerged piles were not left where dangerous to navigation in removing the traps.

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The launch built for inspection purposes was in commission from July 1, 1909, to November 9, 1909.

The federal regulations relative to fish traps are so well known to and complied with by operators that frequent inspections are no longer necessary, and the launch was not placed in commission during the fishing season of 1910.

This work is considered worthy of continuance, but not to the extent heretofore carried on. The work can be properly conducted at an estimated cost of $3,000 per year.

ALLOTMENTS.

Act of June 13, 1902 (allotment of Feb. 13, 1904)	$4,000
Act of June 13, 1902 (allotment of Aug. 4, 1904)	2,000
Act of June 13, 1902 (allotment of Dec. 15, 1904)	2,000
Act of June 13, 1902 (allotment of Apr. 17, 1905)	5,000
Act of March 3, 1905 (allotment of Feb. 28, 1906)	6,000
Act of March 3, 1905 (allotment of Feb. 23, 1907)	6,000
Act of March 2, 1907 (allotment of Jan. 21, 1908)	6,000
Act of March 2, 1907 (allotment of Apr. 5, 1909	4,000
Total	35,000

W W 6.

IMPROVEMENT OF HARBOR AT OLYMPIA, WASHINGTON.

There were no operations during the past fiscal year except general care of the work, inspections, and compilation of commercial statistics.

The improvement of Olympia Harbor is considered worthy to the extent covered by the project adopted by the act of June 25, 1910.

APPROPRIATIONS.

July 13, 1892	$35,000
August 18, 1894	40,000
June 3, 1896	32,000
March 3, 1899	15,000
June 13, 1902	25,000
June 25, 1910	15,000
Total	162,000

Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912, for works of improvement	[a] $43,000
Submitted in compliance with requirements of sundry civil act of June 4, 1897.	

[a] Exclusive of the balance unexpended July 1, 1910.

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COMMERCIAL STATISTICS, 1909.

Freight traffic.

Article.	Amount.	Short tons.	Value.
Farm products		1,559	$86,356
Fruits and vegetables		368½	27,479
Hardware and machinery		883½	196,319
Logs	69,669,900 feet b. m	104,443	617,021
Lumber	2,319,760 feet b. m	3,478	25,509
Miscellaneous		3,569½	533,080
Oysters and fish		1,573	134,660
Shingle bolts	321 cords	321	963
Total		116,195½	1,611,387

W W 7.

IMPROVING HAMMERSLEY INLET, WASHINGTON.

This is a new work, no operations were in progress during the year, and no expenditures made to June 30, 1910.

Hammersley Inlet is considered worthy of improvement by the General Government to the extent covered by the existing project.

APPROPRIATION.

June 25, 1910 ..... $9,000

COMMERCIAL STATISTICS, 1909.

Freight traffic.

Article.	Short tons.	Value.
Agricultural implements	39½	$1,380
Beer	236	15,104
Butter	42	21,156
Fish and oysters	641	57,020
Flour	298	14,885
Fruit	257	22,764
Grain	905	26,895
Hardware	773	154,640
Hay	217	5,430
Hides	35	7,000
Live stock	25	4,380
Machinery	51	12,750
Milk, canned	68	8,450
Miscellaneous	2,194	462,523
Sugar	132	14,520
Tobacco	30	30,000
Vegetables	81	2,880
Total	6,114½	862,776

Lumber and logs towed 230,132 tons valued at $1,170,425.

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W W 8.

IMPROVEMENT OF TACOMA HARBOR, WASHINGTON.

PUYALLUP WATERWAY.

Work under the contract continued until April 26, 1910, when the contract was terminated by limitation.

During the year 956,599 cubic yards of material were excavated from the waterway and deposited on the adjacent tide lands.

The following quantities of material were placed in the bulkheads:

Piling	linear feet	186,489
Timber	feet b. m.	556,328
Brush	cords	2,195
Rock	cubic yards	9,600

Under date of July 20, 1909, the contract was modified to permit payment for excavation by measurement of fill instead of in cut, and dredging a shallow cut through entire length of channel instead of dredging to full width and depth.

During the fall of 1909 severe floods in the Puyallup River and its tributaries brought down vast quantities of material and deposited it in the dredged channel in Puyallup waterway, and practically obliterated the excavation done under this project. On account of the impracticability of securing a channel of the required dimensions under existing conditions all operations ceased upon expiration of the time limit of the contract.

The Puyallup waterway is considered unworthy of further improvement by the General Government unless the river is first diverted or the project otherwise modified.

APPROPRIATIONS.

CITY WATERWAY.

June 13, 1902	$75,000.00
March 3, 1903	100,000.00
Total	175,000.00

PUYALLUP WATERWAY.

March 3, 1905	$40,000.00
June 30, 1906	160,000.00
March 4, 1909	40,000.00
Received from sales	.40
Total	240,000.40

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COMMERCIAL STATISTICS, 1909.

Freight traffic.

Article.	Amount.	Short tons.	Value.
Army supplies		700	$105,000
Asphalt		2,767	45,700
Beer		2,629	105,160
Brick	2,943,500 pieces	5,887	294,350
Box shooks		5,153	46,657
Butter		57	24,500
Cable	171 miles	462	119,700
Cement		17,177	206,124
Fish and oysters		707	92,900
Flour		54,241	2,168,276
Eggs		17	6,171
Fruit		87	6,960
Grain		129,016	4,398,818
Gypsum rock		23,532	96,337
Hay		5,666	129,056
Hides		176	58,625
Laths	23,181,910 pieces	5,795	34,773
Lime and limestone		28,395	87,611
Live stock	556 head	517	28,661
Logs	113,233,540 feet b. m	169,649	1,019,097
Lumber	126,612,841 feet b. m	189,918	1,392,732
Meats		994½	311,355
Miscellaneous		111,220½	10,705,541
Plaster		4,813	51,833
Pig iron		1,469	34,060
Powder		5,062½	910,110
Products of smelter		17,691	6,800,004
Ore		91,513	4,633,861
Oil		43,485	563,330
Piling	22,264 linear feet	986	1,838
Sand and gravel		162,500	85,400
Shingles	1,386,000 pieces	132	2,494
Soda, nitrate of		7,788	100,082
Sugar		7,784	856,240
Tea		52	31,200
Total		1,097,938½	35,554,496

W W 9.

IMPROVEMENT OF WATERWAY CONNECTING PUGET SOUND WITH LAKES UNION AND WASHINGTON.

There were no field operations during the year except the operation and care of the dam at Fremont and the log canal at the portage and a general supervision of the right of way and of Lakes Union and Washington.

The waterway to connect Puget Sound with Lakes Union and Washington is considered worthy of improvement by the General Government to the extent covered by the project adopted by the act of June 25, 1910.

Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912, for works of improvement ..... [a] $100,000
Submitted in compliance with requirements of sundry civil act of June 4, 1897.

[a] Exclusive of the balance unexpended July 1, 1910.

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APPROPRIATIONS.

Total appropriations to December 31, 1902 (p. 325, H. Doc. No. 421, 57th Cong., 2d sess.)	$335,000.00
March 3, 1905	125,000.00
March 2, 1907	10,000.00
Act of March 3, 1909 (allotment of Apr. 23, 1909)	5,000.00
Act of June 25, 1910	155,000.00
Received from sales	2.45
Total	630,002.45

COMMERCIAL STATISTICS, 1909.

Freight traffic.

LAKE WASHINGTON.

Article.	Amount.	Short tons.	Value.
Coal		12,240	$36,720
Hardware and building material		80	2,500
Hay and grain		320	9,200
Fruit, fresh and canned		77	4,050
Live stock	250 head	75	12,500
Logs	74,726,381 feet b. m	112,089	6,725,367
Lumber	420,000 feet b. m	630	4,620
Milk		760	27,260
Miscellaneous merchandise		7,073	633,763
Poles	79,500 linear feet	2,981	5,565
Shingles	15,550,000 pieces	1,475	29,000
Shingle bolts	6,990 cords	6,990	21,000
Wood	1,480 cords	1,480	2,960
Total		146,270	7,514,505

LAKE UNION.

Logs	56,458,966 feet b. m	84,687	$508,122
Piling and poles	27,302 linear feet	1,000	2,000
Wood	1,425 cords	1,400	1,285
Total		87,087	511,407

SALMON BAY—BALLARD.

Hay and grain		172	$4,300
Lath	1,728,200 pieces	432	2,592
Logs	88,341,747 feet b. m	298,500	7,791,000
Lumber	13,862,178 feet b. m	21,000	152,482
Miscellaneous merchandise		880	13,760
Poles and piling	74,500 linear feet	2,785	5,215
Sand and gravel		46,000	23,000
Shingles	33,600,000 pieces	3,192	60,500
Shingle bolts	10,000 cords	10,000	30,000
Total		382,961	8,083,049

W W 10.

IMPROVEMENT OF HARBOR AT EVERETT, WASHINGTON.

No work was done during the year and no expenditures were made.

APPROPRIATIONS.

Total appropriations to December 31, 1902 (p. 324, H. Doc. No. 421, 57th Cong., 2d sess.)	$422,000

For commercial statistics, see report on Snohomish River, Washington.

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WW 11.

IMPROVING SNOHOMISH RIVER, WASHINGTON.

Appropriation of funds for this work was made by the act of June 25, 1910; no work has been done during the fiscal year and no expenditures made to June 30, 1910.

Snohomish River is considered worthy of improvement by the General Government to the extent covered by the project adopted by the act of June 25, 1910.

Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912, for works of improvement ..... * $255,000

Submitted in compliance with requirements of sundry civil act of June 4, 1897.

APPROPRIATION.

June 25, 1910 ..... $25,000

COMMERCIAL STATISTICS, 1909.

Freight traffic.

Article.	Amount.	Tons.	Value.
Brick	87,500 pieces	175	$875
Flour, grain, feed, etc		2,747	161,698
Fruits and vegetables		4,490	122,480
Hardware and building material		260	26,000
Lath	6,130,000 pieces	1,532	9,198
Lime rock		5,617	11,234
Live stock		290	21,750
Logs	324,000,000 feet b m	486,000	2,916,000
Lumber	176,000,000 feet b m	264,000	1,936,000
Machinery		2,850	127,500
Miscellaneous merchandise		13,573	1,289,363
Ore		4,700	101,250
Paper		1,263	63,150
Piling and poles	3,165,840 linear feet	118,718	220,908
Sand and gravel		7,402	5,700
Shingles	100,700,000 pieces	9,566	181,260
Shingle bolts	3,000 cords	3,000	9,000
Total		926,183	7,203,365

WW 12.

IMPROVING SKAGIT RIVER, WASHINGTON.

Funds for this work were appropriated by the act of June 25, 1910.

There were no operations during the year and no expenditures made to June 30, 1910.

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* Exclusive of the balance unexpended July 1, 1910.

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Skagit River is the largest river in western Washington tributary to Puget Sound, and is considered worthy of improvement by the General Government.

APPROPRIATION.

June 25, 1910 ..... $100,000

COMMERCIAL STATISTICS, 1909.

Freight traffic.

Article.	Amount.	Short tons.	Value.
Farm produce		1,207	$103,336
Fish		810	40,500
Flour, grain, etc		15,900	504,600
Groceries, etc		202	21,900
Hay		3,994	75,880
Live stock		512	65,875
Logs	65,924,925 feet b. m	98,886	593,325
Milk		6,200	629,335
Miscellaneous merchandise		10,657	741,906
Piling	63,510 linear feet	2,381	4,445
Total		140,839	2,781,602

W W 13.

IMPROVEMENT OF SWINOMISH SLOUGH, WASHINGTON.

With funds provided by the act of March 3, 1909, a pile, brush, and stone dike 1,500 feet long was built in Swinomish Slough, opposite the town of La Conner, at a cost of $9,290.51. The work was done by contract.

The following materials were used in building the dike, at the prices stated:

Piling (13,584 linear feet, at 13 cents)	$1,765.92
Wire (1,492 pounds, at 5 cents)	74.60
Spikes (4,100 pounds, at 5 cents)	205.00
Lumber (56,664 feet b. m., at $23)	1,302.81
Brush fascines (1,305.28 cords, at $3.25)	4,242.16
Stone (877.7 tons, at $1.60)	1,404.32
Total	8,994.81

This dike was designed to so contract the channel between La Conner and Gallaher Point that the tidal currents would remove a shoal at the locality. Before construction of this dike the depth of water on the shoal was less than 2 feet at mean lower low water. The dike has had the desired effect and the depth on the shoal is now 4 feet at mean lower low water.

The channel between La Conner and Goat Island was dredged with government plant, and the excavated material, 5,500 cubic yards, was used for fill in front of Battery Harrison, Fort Whitman.

Swinomish Slough is considered worthy of improvement by the General Government to the extent of maintaining a channel 4 feet deep at lower low water from Saratoga Passage to La Conner.

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APPROPRIATIONS.

Total appropriations to December 31, 1902 (p. 325, H. Doc. No. 421, 57th Cong., 2d sess.)	$125,000
March 3, 1905	5,000
March 2, 1907	75,000
Act of March 3, 1909 (allotment of June 26, 1909)	10,000
June 25, 1910	10,000
Total	225,000

CONTRACT IN FORCE (EMERGENCY).

Name of contractor: American Pile Driving Company.
Character of work: Dike construction.
Unit prices:
Piling, 13 cents per linear foot.
Lumber, $23 per M feet b. m.
Spikes, 5 cents per pound.
Brush, $3.25 per cord.
Wire, 5 cents per pound.
Stone, $1.60 per ton of 2,000 pounds.
Date of contract, July 30, 1909.
Date of commencement, August 1, 1909.
Date of completion, November 1, 1909.
Time limit waived and contract completed November 11, 1909.

COMMERCIAL STATISTICS, 1909.

Freight traffic.

Articles.	Amount.	Short tons.	Valuation.
Coal		250	$1,000
Fish		1,410	58,300
Hay		7,300	120,000
Oats		40,503	1,177,060
Sand and gravel	3,000 cubic yards	4,700	1,500
Total		54,163	1,358,460

W W 14.

IMPROVEMENT OF BELLINGHAM HARBOR, WASHINGTON.

There have been no operations during the past fiscal year and no expenditures were made.

Previous operations at Bellingham Bay were carried on under the appropriation title "Improving Harbor at New Whatcom, Wash."

Bellingham Bay is considered worthy of improvement by the General Government to the extent covered by the existing project.

Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912, for works of improvement	[a] $77,250

Submitted in compliance with requirements of sundry civil act of June 4, 1897.

[a] Exclusive of the balance unexpended July 1, 1910.

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APPROPRIATIONS.

June 13, 1902	$25,000
March 3, 1905	35,000
June 25, 1910	15,000
Total	75,000

OMMERCIAL STATISTICS, 1909.

Freight traffic.

Articles.	Amount.	Short tons.	Value.
Agricultural implements		951	$257,700
Brick	55,000	110	5,500
Box shooks	2,000,000	7,500	226,000
Cans, tin	5,000,000	400	104,000
Coal		7,060	35,000
Dairy and farm products		13,051	414.000
Fish, fresh		22,000	1,760,000
Fish, shell	4,000 sacks	200	20,000
Fish, canned		21,650	2,598,000
Flour, feed, grain, and hay		6,080	193,200
Hardware and building material		6,500	363,400
Hides		450	27,000
Ironwork		3,500	350,000
Lath	18,000,000	4,500	27,000
Logs	90,000,000 feet b. m.	135,000	810,000
Live stock		2,800	48,000
Lumber	60,000,000 feet b. m.	90,000	660,000
Miscellaneous merchandise		9,172	854,450
Powder		218	64,000
Shingles	10,100,000	959	19,000
Tin		2,400	21,000
Total		334,501	8,857,250

W W 15.

IMPROVEMENT OF COLUMBIA RIVER BETWEEN WENATCHEE AND BRIDGEPORT, WASHINGTON.

The work done consisted exclusively in the removal of Chelan rock which was drilled, but not blasted, during the previous fiscal year.

Work can be carried on advantageously only during low water, and the periods of low water during the year were much later and of shorter duration than usual.

Chelan rock contained about 2,000 cubic yards above the elevation of 6 feet below low water. This volume of rock was broken up by blasting but not removed at the time on account of a rapid rise in the river and the presence of ice. The effectiveness of the work can not be determined until the next low-water period.

The Columbia River between Wenatchee and Bridgeport is considered worthy of improvement so far as available funds will permit.

APPROPRIATIONS.

Act of March 2, 1907	$42,000.00
Act of June 25, 1910	25,000.00
Received from sales	2.50
Total	67,002.50

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COMMERCIAL STATISTICS, 1909.

Freight traffic.

Article.	Amount.	Short tons.	Value.
Flour, wheat, etc.		13,236½	$416,829
Fruit		2,140	88,765
Hardware		2,991	867,100
Implements		1,059	238,050
Live stock	3,162 head	2,076	92,685
Miscellaneous merchandise		11,473½	2,226,561
Total		33,976	3,929,990

W W 16.

IMPROVING COLUMBIA RIVER BETWEEN BRIDGEPORT AND KETTLE FALLS, WASHINGTON.

Funds for this work were provided by the act of June 25, 1910. No work was done during the year, and no expenditures made to June 30, 1910.

This part of the Columbia River is considered worthy of improvement by the General Government to the extent covered by the project adopted by the act of June 25, 1910.

APPROPRIATION.

June 25, 1910 ..... $100,000

W W 17.

IMPROVEMENT OF OKANOGAN AND PEND OREILLE RIVERS, WASHINGTON.

No work was done on the Okanogan River during the year.

On the Pend Oreille River dredging was resumed by the contractor on August 30, 1909, at Conquest bar and a channel 75 feet wide and 6 feet deep at low water was excavated. The work at that locality was completed on October 30, 1909. Owing to inefficient plant and unfavorable weather conditions, work was not resumed until January 7, 1910, when operations were commenced at Yakima bar. Fluctuations in water levels and ice permitted only intermittent work until March 21, 1910, when the work ceased on account of the continued rise of the water. At Conquest and Yakima bars 5,892 cubic yards of material were excavated during the year.

Owing to unsatisfactory progress made by the contractor and a doubt as to the benefits to be derived or the necessity for further improvement of the Pend Oreille River between Newport and Box Canyon, the contract was annulled on April 14, 1910. Since the work of improvement under the contract of August 21, 1908, was commenced a railroad has been built along the left bank of the river from Newport to Ione, about 9 miles below Yakima bar, where dredging under the Beckman contract was terminated, and 3 miles above Box Canyon. Boat service on this part of the river was discontinued as the railroad construction advanced, the river traffic, with the exception of the towage of logs and poles, was absorbed by the railroad, and the depths in the navigable channels are sufficient for the class of vessels employed in existing or prospective traffic.

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For the above-mentioned reasons the Pend Oreille River between Newport and Box Canyon is not considered worthy of further improvement by the General Government.

It is doubtful whether the period of low-water navigation has been extended on the Okanogan River as a result of the work done under the existing project, at a cost of $38,044.25.

Steam and electric railway lines are now being built which will absorb practically all of the river traffic.

The value of existing commerce carried on this river is not commensurate with the probable cost of securing and maintaining navigable depths at low water and the Okanogan River is therefore considered unworthy of further improvement by the General Government.

APPROPRIATIONS.

Total appropriations to December 31, 1902 (H. Doc. No. 421, 57th Cong., 2d sess., p. 325)	$47,500
March 3, 1905	15,000
March 2, 1907	20,000
Total	82,500

CONTRACT IN FORCE (EMERGENCY).

Name of contractor: Charles E. Beckman.
Character of work: Dredging 32,000 cubic yards of clay, sand, etc.
Unit price: 50 cents per cubic yard.
Date of contract: August 21, 1908.
Date of commencement: October 21, 1908.
Date of completion: March 21, 1909.
Time limit: Waived for a reasonable period.
Contract annulled: April, 1910.

COMMERCIAL STATISTICS, 1909.

Freight traffic.

OKANOGAN RIVER.

Article.	Amount.	Short tons.	Value.
Agricultural implements and machinery		20½	$460
Coal		30	270
Furniture		25	2,500
Hardware		80½	23,200
Lumber, shingles, and doors		90	2,520
Merchandise, groceries, etc.		900	160,000
Miscellaneous		25	4,250
Total		1,171	193,200

PEND OREILLE RIVER.

Flour		31	$1,550
Hardware		30	2,500
Hay and grain		330	4,660
Live stock		56	15,635
Lumber	2,700,000 feet b. m.	4,000	58,000
Miscellaneous		205	16,791
Sugar		12	1,680
Vegetables		15	304
Total		4,679	101,120

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W W 18.

IMPROVING POLSON BAY, MONTANA.

This is a new work. The project was adopted by the act of June 25, 1910.

No work was done during the year and no expenditures were made to June 30, 1910.

Polson Bay is considered worthy of improvement to the extent covered by the existing project.

APPROPRIATIONS.

June 25, 1910	$6,000

W W 19.

IMPROVEMENT OF ST. MICHAEL CANAL, ALASKA.

A contract was entered into September 25, 1907, as shown in detail under " Contract in force " for dredging the channel to deep water in the canal.

Operations were continued during the working season of 1909 until September 14, 1909, when work was completed as far as funds would permit.

During the year 120,692 cubic yards of material were excavated and 9,650 feet of channel dredged to the required depth and width.

The total quantity of material removed under contract of September 25, 1907, was 157,990 cubic yards and the total length of completed channel was 2.6 miles.

With funds provided by the act of June 25, 1910, $143,000, a contract has been made for completing the project on a modified basis. The modified project contemplates the excavation of a channel 100 feet wide and 6 feet deep at mean low water from station A to station 11A and where necessary between station 11A and point B, also at two sharp bends between 11A and 28A, instead of excavating an expensive cut-off contemplated by the original project.

No work was done under the contract of June 27, 1910, during the fiscal year.

St. Michael Canal is considered worthy of improvement by the General Government, as contemplated by the modified project adopted by the act of June 25, 1910.

APPROPRIATIONS.

March 2, 1907	$98,000.00
May 27, 1908	150,000.00
June 25, 1910	143,000.00
Received from sales	1.55
Total	391,001.55

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CONTRACTS IN FORCE.

Name of contractor: North American Dredging Company.
Character of work: Excavating and removing all materials in channel, or section A; no frozen ground to be dredged; 162,000 cubic yards.
Price per unit: $1.45 per cubic yard.
Date of contract: September 25, 1907.
Date of approval: November 9, 1907.
Date of beginning work: Season of 1908.
Contract completed: September 14, 1909.

EMERGENCY.

Name of contractor: Puget Sound Bridge and Dredging Company.
Character of work: Excavating channel, quantity of material to be removed, 130,000 cubic yards.
Price per unit: 90 cents per cubic yard, place measurement.
Date of contract: June 27, 1910.
Date of beginning work: July 1, 1911.
Date of expiration: November 1, 1911.

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APPENDIX XX.

RIVER AND HARBOR IMPROVEMENTS IN THE DISTRICT OF HAWAII.

REPORT OF MAJ. E. EVELETH WINSLOW, CORPS OF ENGINEERS, OFFICER IN CHARGE FOR THE FISCAL YEAR ENDING JUNE 30, 1910.

IMPROVEMENTS.

1. Honolulu Harbor, Hawaii.
2. Hilo Harbor, Hawaii.
3. Kahului Harbor, Hawaii.

UNITED STATES ENGINEER OFFICE,
Honolulu, Hawaii, July 1, 1910.

SIR: I have the honor to submit herewith annual report upon the works of improvement under my charge for the fiscal year ending June 30, 1910.

Very respectfully,

E. EVELETH WINSLOW,
Major, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

XXI.

IMPROVEMENT OF HONOLULU HARBOR, HAWAII.

For history and description of the work done at this locality, see page 999 of this report and pages 894 and 2267 of the Annual Report of the Chief of Engineers for 1909.

The sum of $979.44 was expended during the fiscal year for office expenses, repairs to tide gauge, and surveys, the latter consisting principally of borings at the site of the dredging expected to be done in the next fiscal year, to determine the character of the material to be removed.

Under the appropriation for maintenance, specifications for the work were prepared and the work was advertised. Only one bid was received, and, being considered exorbitant, was rejected.

For printing, advertising, etc., $8.39 were expended.

Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912, for works of improvement ..... [a] $250,000
Submitted in compliance with requirements of sundry civil act of June 4, 1897.

[a] Exclusive of the balance unexpended July 1, 1910.

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APPROPRIATIONS.

March 3, 1905	$200,000
June 30, 1906	200,000
March 2, 1907	200,000
May 27, 1908	200,000
March 3, 1909	25,000
June 25, 1910	150,000
	975,000
Receipts from sales	11
Total	975,011

COMMERCIAL STATISTICS FOR THE CALENDAR YEAR ENDING DECEMBER 31, 1909.

[From data furnished by the collector of customs of the port of Honolulu.]

Number and tonnage of vessels entering and clearing during the year.

	Steam vessels.	Sailing vessels.	Total.	Total tonnage.
Entered	240	109	349	1,168,751
Cleared	243	104	347	1,141,679
Total	483	213	696	2,310,430

Duties on imports collected	$1,413,234.33
All moneys collected at custom-house	1,450,324.63

Commerce between Honolulu and ports not in the Hawaiian Islands, during calendar year 1909.

Class.	Quantity.	Value.
RECEIPTS.		
From foreign countries:	*Short tons.*	
Food supplies	a 23,575	$1,414,505
Coal	69,315	206,339
Spirits	a 1,838	229,812
Fertilizer	7,370	137,454
Cement	2,721	18,374
Chemicals	a 20,000	999,106
Iron and steel	a 1,588	63,521
Cottons	a 3,300	115,311
Bags	4,500	608,320
Miscellaneous	a 5,125	512,425
	139,332	4,305,167
From the United States to the district of Hawaii:		
Food supplies (including animal food)	a 80,500	4,024,144
Cars, carriages and parts of	a 650	810,470
Chemicals, drugs, etc	a 2,800	579,256
Cotton, and manufactures of	a 71,000	1,775,533
Fertilizer	22,309	916,830
Iron and steel, manufactures of	a 28,200	2,822,073
Leather, and manufactures of	a 917	458,434
Oils	a 65,000	1,409,449
Paper, and manufactures of	a 4,415	441,455
Spirits	a 5,000	623,371
Tobacco, and manufactures of	a 850	644,028
Wood, and manufactures of	a 21,430	1,285,620
Wool, and manufactures of	a 360	292,316
Miscellaneous	a 3,186	3,186,211
Total district of Hawaii	306,617	19,269,190
Total subports	56,598	3,408,081
Total Honolulu	250,019	15,861,109
SHIPMENTS.		
To the United States and foreign countries:		
Sugar	269,364	20,195,767
Fruits	a 11,253	1,462,825
Coffee	976	237,371
Hides and skins	585	120,099
Rice	2,731	244,065
Miscellaneous	a 7,686	768,618
Total	292,595	23,028,745

a Estimated weight.

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The total commerce between the port of Honolulu and ports not in the Hawaiian Islands for the past calendar year amounted to approximately 681,946 short tons, valued at $43,195,021.

LOCAL COMMERCE.

[Between Honolulu and island ports.]

This commerce to a great extent is the distribution and collection of the commerce set forth in the above lists. From statement furnished by the Inter-Island Steam Navigation Company (Limited), this commerce during the past calendar year was as follows:

Freight (sugar and miscellaneous articles)	short tons	346,773
Passengers		57,848

The total commerce of the port therefore amounted to about 1,028,719 short tons, valued at approximately $71,275,000.

In addition to the commerce actually received at and shipped from this port, all that commerce between the United States, the Orient, and Australia carried by ships calling at this port, is directly benefited by this improvement, safer and speedier entrance and exit being afforded the ships carrying it.

X X 2.

IMPROVEMENT OF HILO HARBOR, HAWAII.

For history and description of this work see current summary, page 1001 and pages 895 and 2270 of the Annual Report of the Chief of Engineers for 1909.

Throughout the fiscal year work was in progress under a continuing contract for the construction of the breakwater. During the fiscal year, 69,618 tons of stone were placed in the breakwater, completing 1,229 feet of it.

The sum of $164,120.39 was expended during the year.

Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912, for works of improvement	[a] $500,000

Submitted in compliance with requirements of sundry civil act of June 4, 1897.

APPROPRIATIONS.

March 2, 1907	$200,000
May 27, 1908	100,000
March 4, 1909	100,000
June 25, 1910	200,000
	600,000

CONTRACT IN FORCE.

Contractor: Delbert E. Metzger, Hilo, Hawaii.
Character of work: Breakwater construction.
Rate: $2.485 per ton of 2,000 pounds for stone in place in breakwater.
Date of approval: June 29, 1908.
Date of beginning of work: September 12, 1908.
Date of completion: July 14, 1911.

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[a] Exclusive of the balance unexpended July 1, 1910.

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COMMERCIAL STATISTICS FOR THE CALENDAR YEAR ENDING DECEMBER 31, 1909.

[From data furnished by the collector of customs.]

Number and tonnage of vessels entering and clearing during the year.

	Steam and sailing vessels.	Total tonnage.
Entered	74	221,530
Cleared	73	220,494
	147	442,024

Commerce between Hilo and the United States and foreign ports during calendar year 1909.

Class.	Quantity.	Value.
Shipments to the United States and foreign countries:	*Short tons.*	
Sugar	122,602	$8,571,795
Fruits	a 380	45,712
Hides and skins	56	11,186
Coffee	119	31,157
Miscellaneous	a 1,325	132,669
Total	124,482	8,792,519
Receipts from the United States, miscellaneous	a 21,686	2,168,667
Total	146,168	10,961,186

a Estimated weight.

LOCAL COMMERCE.

[Between Hilo and island ports.]

From statement furnished by the Inter-Island Steam Navigation Company (Limited), this commerce during the calendar year 1909 was as follows:

Freight (sugar and miscellaneous articles)..... short tons.. 77,006

The total commerce of the port, therefore, amounted to about 223,000 short tons, valued at approximately $18,000,000.

XX 3.

IMPROVEMENT OF KAHULUI HARBOR, HAWAII.

The first project adopted for the improvement of this harbor is that contained in the river and harbor act of June 25, 1910, on which no work has yet been done.

Estimate of additional funds required.

Amount required for expenditure in fiscal year ending June 30, 1912, for works of improvement..... a $150,000

Submitted in compliance with requirements of sundry civil act of June 4, 1897.

APPROPRIATION.

June 25, 1910..... $150,000

a Exclusive of the balance unexpended July 1, 1910.

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APPENDIX Y Y.

RIVER AND HARBOR IMPROVEMENTS IN THE DISTRICT OF PORTO RICO.

REPORT OF MAJ. CHAS. L. POTTER, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1910.

IMPROVEMENT.

San Juan Harbor, Porto Rico.

UNITED STATES ENGINEER OFFICE,
Tompkinsville, N. Y., July 20, 1910.

SIR: I have the honor to forward herewith annual reports upon river and harbor improvements under my charge in Porto Rico for the fiscal year ending June 30, 1910.

CHAS. L. POTTER,
Major, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

IMPROVEMENT OF HARBOR AT SAN JUAN, PORTO RICO.

Work was carried on under a continuing contract with the Standard Dredging Company, of Wilmington, Del., for removing soft material at a cost of 19 cents per cubic yard (scow measurement) and coral rock at $6.80 per cubic yard (place measurement). With few delays, due to breakdown and bad weather, the work was continuous. On February 6, 1909, the winter weather having been unusually bad that year, a supplemental contract was made with the company whereby they were allowed, when the weather was too bad to tow to sea, to dump the material in a remote portion of the harbor, material so dumped to be paid for at the rate of 14 cents per cubic yard for soft material and $6.50 per cubic yard for coral rock—a reduction of 5 cents and 30 cents per cubic yard, respectively. This dumping ground was at such a point that it is improbable that it will ever have to be removed.

During the year there was removed 224,129 cubic yards of soft material and 20,177.54 cubic yards of coral rock. Of the former, 1,637 cubic yards were dumped under the supplemental contract.

The project has been completed, except some possible cleaning up, which may be shown to be necessary by a survey now in progress, and except the cut across St. Elena shoal, at the widening of the channel

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around Morro Point. Work on this shoal has been begun and a single cut across its point to a depth of 27 feet has been made.

The appropriation in the river and harbor act of June 25, 1910, of $20,000 provides sufficient funds to clean up any shoaling which may have occurred at any point since the completion of the dredging, and will leave the harbor in good condition.

COMMERCIAL STATISTICS.

There is difficulty in obtaining exact commercial statistics for this harbor. The custom-house records are kept in money value only (not in tons), and apply to the whole of Porto Rico. As the class of material imported and exported is the same each year, and as the principal portion of the commerce of the island is done through San Juan, and the relative proportions done at other points remain about the same, a comparison of the money value of the whole commerce of Porto Rico will indicate any great change in the tonnage of San Juan Harbor.

Value of commerce handled in Porto Rico during the fiscal years ending June 30, 1908 and 1909.

Value of merchandise shipped to the United States	$12,647,041
Value of merchandise shipped to foreign countries	600,771
Value of merchandise imported from the United States	27,097,654
Value of merchandise imported from foreign countries	2,060,256

Vessels entering and clearing at San Juan during the fiscal year ending June 30, 1910.

	Tonnage.
American vessels entered (237)	359,190
Foreign vessels entered (184)	292,204
American vessels cleared (244)	387,586
Foreign vessels cleared (188)	295,346

The exports consist principally of sugar, tobacco, coffee, and fruit, and the imports consist of provisions, cloth goods, iron and steel, lumber, and general merchandise.

APPROPRIATIONS.

March 2, 1907	$157,500
May 27, 1908	220,000
March 4, 1909	300,000
June 25, 1910	[a] 100,000
Total	777,500

CONTRACT IN FORCE.

Contractor: Standard Dredging Company, Wilmington, Del.
Rates: Removing soft material (scow measurement), 19 cents per cubic yard; removing coral rock (place measurement), $6.80 per cubic yard.
Date of approval: October 10, 1907.
Date of commencement: January 21, 1908.
Date of completion: Indefinite.

SUPPLEMENTAL CONTRACT.

Contractor: Standard Dredging Company, Wilmington, Del.
Rates: Removing soft material (scow measurement), 14 cents per cubic yard; removing coral rock (place measurement), $6.50 per cubic yard.
Date of approval: February 8, 1909.
Date of commencement: February 10, 1909.
Date of completion: Indefinite.

[a] $20,000 of this is for maintenance.

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APPENDIX Z Z.

ANNUAL REPORT OF THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS FOR THE FISCAL YEAR ENDING JUNE 30, 1910.

THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., July 18, 1910.

SIR: The Board of Engineers for Rivers and Harbors has the honor to submit the following report of its operations during the fiscal year ending June 30, 1910. Information concerning the organization of the Board and its duties, as prescribed by the act of June 13, 1902, was contained in the Board's annual report for the fiscal year ending June 30, 1904 (p. 3671). Subsequent acts of Congress have extended the scope of the Board's investigations, and additional duties have been assigned to it by the Chief of Engineers from time to time.

In its last annual report the membership of the Board on June 30, 1909, was recorded as follows: Col. D. W. Lockwood, Col. John G. D. Knight, Col. Smith S. Leach, Lieut. Col. W. C. Langfitt, and Maj. W. J. Barden, Corps of Engineers.

Since June 30, 1909, the following changes have occurred in the personnel of the Board:

September 21, 1909, by Special Orders, No. 52, Office of the Chief of Engineers, Col. William T. Rossell was detailed as a member of the Board, vice Col. Daniel W. Lockwood, retired from active service.

October 18, 1909, by Special Orders, No. 60, Office of the Chief of Engineers, Maj. Herbert Deakyne was detailed as a member of the Board, vice Col. Smith S. Leach, who died on October 16, 1909.

December 8, 1909, by Special Orders, No. 71, Office of the Chief of Engineers, Maj. William E. Craighill was appointed a member of the Board, vice Col. John G. D. Knight, appointed brigadier-general, United States Army.

March 12, 1910, by Special Orders, No. 11, Office of the Chief of Engineers, Lieut. Col. Henry C. Newcomer was detailed temporarily as a member of the Board, during the absence on leave of Lieutenant-Colonel Craighill.

March 25, 1910, by Special Orders, No. 13, Office of the Chief of Engineers, Lieut. Col. Henry C. Newcomer was relieved from temporary duty on the Board, to take effect March 31, 1910.

June 13, 1910, by Special Orders, No. 27, Office of the Chief of Engineers, Lieut. Col. Henry C. Newcomer was appointed a member of the Board, vice Lieut. Col. William E. Craighill, thereby relieved.

On June 30, 1910, the Board was constituted as follows: Col. William T. Rossell, Lieut. Col. William C. Langfitt, Lieut. Col. Henry C. Newcomer, Maj. Herbert Deakyne, and Maj. William J. Barden.

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At the close of the preceding fiscal year the Board had taken final action on all cases carried by the act of March 2, 1907, with the exception of one. The act of March 3, 1909, provided for 277 examinations, contained in 272 items. Consideration of these cases was in progress throughout the year. By June 30, 1910, 271 reports on examinations ordered by that act had been received by the Board. Of the 271 received, action had been taken on 262, while 9 were under consideration. Of the 262 cases on which action had been taken, 126 had been finally disposed of by unfavorable action, 95 by favorable action following surveys and the submission of estimates of cost, and 41 were held for surveys and estimates recommended by the Board but not yet considered. There are therefore 50 cases of the act of March 3, 1909, remaining to be disposed of.

The following shows the aggregate amounts recommended by the Board in reviewing reports on preliminary examinations and surveys ordered by acts of Congress since its organization, and the proportion of the same adopted by Congress.

	Estimated cost of projects recommended by Board.	Estimated cost of projects adopted by Congress.
Act of June 13, 1902	$13,240,243.07	$6,872,158.85
Act of March 3, 1905	102,525,448.33	97,522,672.33
(The above includes the cost of improving Ohio River to a depth of 9 feet, $63,731,500, already in progress.)		
Act of June 28, 1906	168,300.00	168,300.00
Act of March 2, 1907	49,686,193.44	44,164,867.90
Act of May 27, 1908	3,988,480.00	3,988,480.00
Act of March 3, 1909 (incomplete)	38,664,013.34	35,218,520.96

As Congress has not had opportunity to act on all projects recommended by the Board, pursuant to investigations ordered by the act of March 3, 1909, the last item may be assumed to be less than the final figure. Similar figures may be given for improvements recommended by the Board since its organization, as a result of investigations made in compliance with resolutions of the Committee on Rivers and Harbors of the House of Representatives and the Committee on Commerce of the Senate, as follows:

Fiscal year.	Estimated cost of projects recommended by Board.	Estimated cost of projects adopted by Congress.
1904	$911,825	$886,000
1905	8,550,000	8,550,000
1907	11,506,857	11,506,857
1908	433,000	233,000
1909	2,179,000	2,119,000
1910	1,387,090	1,387,090

The above figures indicate that out of $233,240,390.18 recommended by the Board since its organization, Congress has adopted projects estimated to cost $212,616,887.04, or 91 per cent.

In compliance with resolutions of the Committee on Rivers and Harbors, and instructions from the Chief of Engineers, U. S. Army,

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the Board considered and reported its conclusions on the following subjects during the last fiscal year:

Buffalo Harbor, New York, removal of Watson elevator site.
Arcadia Harbor, Michigan.
Erie Harbor, New York.
Rogers City, Mich.
Grays Harbor and Bar, Washington.
White Lake and Pentwater harbors, Michigan.
Brazos River, at the mouth, Texas.
Tillamook Bay and Bar, Oregon.
Upper Machodoc Creek, Virginia.
Au Sable River, Michigan.
Hempstead Harbor, New York.

In compliance with requests of the Committee on Commerce of the Senate the Board reported upon the following subjects:

Tacoma Harbor, Washington.
Grays Harbor bar, Washington, north jetty.
St. Lucie Inlet, Florida.
St. Louis River, Minnesota.
St. Michaels Canal, Alaska.

In addition to the above, there are 15 resolutions before the Board on which final action has not yet been taken.

By direction of the Chief of Engineers the Board has in progress the preparation of a compilation of drawings and data showing typical forms of construction used in works of river and harbor improvement. As the various sheets are completed they will be issued separately in mimeograph form, accompanied by related text. Four sheets have already been prepared for issue in this manner, and a number of others are in preparation. This work has considerably increased the business of the office. It is in immediate charge of Col. D. W. Lockwood, U. S. Army, retired, assistant to the Board.

In connection with the various subjects referred to it for report and recommendation, the Board held public hearings and made inspections as follows:

Place of hearing.	Date.	Subject.	Inspection.
	1909.		
New York, N. Y	July 8	Bay Ridge and Red Hook channels	
Biddeford, Me	Aug. 5	Saco River	Yes.
Little Rock, Ark	Oct. 20	Arkansas River, from Little Rock to Ozark	Yes.
Mantua, N. J	Nov. 3	Mantua Creek	Yes.
Jacksonville, Fla	Dec. 30	St. Johns River	
Buffalo, N. Y	Dec. 29	Dunkirk Harbor	
Do	...do...	Buffalo Harbor, Watson elevator site	
	1910.		
Atlantic City, N. J	Jan. 13	Absecon Inlet	Yes.
Philadelphia, Pa	Feb. 24	Delaware River	
Parkersburg, W. Va	Mar. 29	Little Kanawha River	Yes.
Vicksburg, Miss	Apr. 6	Big Sunflower River	Yes.
Brownsville, Tex	May 4	Brazos, Santiago Harbor, and Intracoastal Waterway.	Yes.
St. Louis, Mo	May 9	Lock at Keokuk	
Newbern, N. C	June 8	Neuse and Trent rivers	Yes.
New York, N. Y	June 20	Flushing Bay	Yes.
Portsmouth, N. H	June 21	Portsmouth Harbor	Yes.
		Cocheco River	Yes.
		Lamprey River	Yes.
		Exeter River	Yes.
Newark, N. J	June 28	Passaic River	Yes.

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Sixty-six hearings to Members of Congress and other interested persons were given at the office of the Board in relation to the following subjects:

Date.	Subject.	Date.	Subject.
1909.		January 17	Channel from Aransas Pass to Rockport, Tex.
July 6	Kissimmee River, Fla.	Do	Little Pedee River, S. C.
Do	Crum River, Pa.	Do	White Lake and Pentwater harbors, Mich.
July 12	Obey River, Tenn.	January 24	Oakland Harbor, Cal.
Do	Cumberland River, Tenn.	Do	Dunkirk Harbor, N. Y.
July 19	Oconto Harbor, Wis.	Do	Crum River, Pa.
July 26	Cumberland River, Tenn.	Do	Saginaw River, Mich.
August 2	Channel from Aransas Pass to Corpus Christi.	January 25	Bogue Sound, N. C.
September 13	White Lake and Pentwater Harbors, Mich.	Do	Chincoteague Inlet, Va.
September 20	Passaic River, N. J.	Do	New Bedford Harbor, Mass.
September 27	Inner Harbor, Great Salt Pond, R. I.	January 31	Atchafalaya River, La.
Do	Great Pedee River, S. C.	Do	Lorain Harbor, Ohio.
October 4	Horn Island Pass, Miss.	February 1	Sabine Pass and Port Arthur Ship Channel, Tex.
October 11	Red Lake River, Minn.	Do	Erie Harbor, Pa.
October 18	Indian Creek, Jamaica Bay, L. I.	February 7	Dunkirk Harbor, N. Y.
November 1	Leaf and Pascagoula Rivers, Miss.	Do	Livingstone Channel, Detroit River, Mich.
November 8	Brazos Santiago Harbor, Tex.	February 8	Connecticut River, between Hartford and Holyoke.
December 6	Cumberland River, Tenn.	February 15	Monterey Bay, Cal.
December 13	Beaufort Harbor, N. C.	February 21	Little Kanawha River, W. Va.
Do	Leland Harbor, Mich.	Do	Saginaw River, Mich.
Do	Upper Machodoc Creek, Va.	Do	Fall River Harbor, Mass.
December 7	Jefferson-Shreveport Waterway.	February 28	Smiths Creek, N. C.
Do	Nantucket Sound, Mass.	Do	Connecticut River, between Hartford and Holyoke.
Do	Nanticoke River, Del. and Md.	March 1	Sterling Basin, Greenport Harbor, N. Y.
December 20	Hillsboro Bay, Fla.	March 7	Hanapepe Bay, H. I.
December 27	Kahului Harbor, H. I.	Do	Port Clinton Harbor, Ohio.
1910.		March 14	Northeast Branch, Cape Fear River, N. C.
January 3	Waterway from Humboldt Bay to Eel River, Cal.	March 15	Sabine and Neches rivers, Tex.
January 10	Ontonagon Harbor, Mich.	March 21	Do.
Do	Caney Fork, Tenn.	March 28	Norfolk-Beaufort section of Intracoastal Waterway.
Do	Crum River, Pa.	Do	Manistee Harbor, Mich.
January 11	Channel from Aransas Pass to Corpus Christi, Tex.	April 11	Missouri River, at Lake Contrary.
Do	Jefferson-Shreveport Waterway.	May 16	Mamaroneck Harbor, N. Y.
Do	Kahului Harbor, H. I.		
Do	Arcadia Harbor, Mich.		

Expenses of the Board during the fiscal year may be briefly summarized as follows:

Rent of offices	$1,800.00
Salaries of civilian assistants	10,862.29
Mileage and traveling expenses	5,406.62
Miscellaneous	1,444.91
Total	19,513.82

For the Board:
Very respectfully,

WM. T. ROSSELL,
Colonel, Corps of Engineers,
Senior Member of the Board.

The CHIEF OF ENGINEERS, U. S. ARMY.

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APPENDIX A A A.

STATEMENT OF FLOATING PLANT OWNED BY THE UNITED STATES AND EMPLOYED IN THE ENGINEER DEPARTMENT AT LARGE FOR THE FISCAL YEAR ENDING JUNE 30, 1910.

Reports of operations of certain of the dredging plants owned and operated by the Engineer Department at Large, U. S. Army.

[Compiled for the fiscal year ending June 30, 1910, and shown in tabular form.]

Table I shows in detail the work done and cost of dredging by Class A seagoing dredges in the various engineer districts.

Table II shows in detail the work done and cost of dredging by Class B pipe-line hydraulic dredges in the various engineer districts.

For particulars of other Class B dredges see reports of the Mississippi River Commission and the Chief of Engineers.

Table III shows in detail the work done and cost of dredging by certain of the Class C dipper and bucket dredges in the various engineer districts.

Table IV shows an alphabetically arranged list by classes of all the more important vessels belonging to the Engineer Department.

Table V shows a list by districts of all the floating plant of every description owned and operated by the Engineer Department.

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TABLE I.—*Performances of United States seagoing dredges for the fiscal year ending June 30, 1910.*

Name	*Gedney.*	*Charleston.*	*Chinook.*	*Cape Fear.*
Where built	Wilmington, Del.	Brooklyn, N. Y.	Belfast, Ireland	Philadelphia, Pa.
When built	1887	1891	1892	1895.
Builder			Harland & Wolfe	Charles Hillman S. & E. B. Co.
Contract cost	$72,500	$65,000		$55,780.
Cost of outfit				$5,029.30.
Time to build				9 months.
Material of hull	Wood	Wood	Steel	Wood.
Length over all	157 feet	122 feet 6 inches	445 feet	131 feet 3 inches.
Length between perpendiculars	149 feet	116 feet 6 inches	49 feet	113 feet 9 inches.
Beam	36 feet 6 inches	30 feet	30 feet	29 feet.
Depth amidship	16 feet	20 feet		17 feet.
Drafts, light:				
Forward	7 feet	9 feet 6 inches	15 feet 3 inches, mean	7 feet 4 inches.
Aft	16 feet 5 inches	12 feet 6 inches		13 feet 4 inches.
Drafts, loaded:				
Forward	21 feet	15 feet 6 inches	24 feet, mean	15 feet 3 inches.
Aft	16 feet 6 inches	17 feet 1 inch		12 feet 11 inches.
Displacement:				
Light	1,500 tons	800 tons		480 tons.
Loaded	2,250 tons	1,100 tons		870 tons.
Number of hoppers	2	2		2.
Total capacity of hoppers	735 cubic yards	318 cubic yards	3,600 cubic yards	300 cubic yards.
Number of drags	2	1		2.
Number, size, and type:				
Dredging pumps	Two 15-inch centrifugal	One 15-inch centrifugal	Two 20-inch centrifugal	Two 10-inch centrifugal.
Pumping engines	Two 15 x 20 inch stroke, simple.	One 13 x 23 x 14 inch compound.	Two 16 x 32 x 18 inch compound.	Two 10½ x 10½ inch stroke, simple.
Revolutions per minute of pumping engines.	148	225		245.
Total indicated horsepower of pumping engines.	300, combined	213		195.
Number, type, size, propelling engines	Two 15 x 26 x 22 inch compound.	One 17 x 32 x 22 inch compound.	Two 22½ x 36½ x 60 x 48 inch triple.	One 15 x 30 x 24 inch compound.
Revolutions per minute of propelling engines:				
Light		120		135.
Loaded	108 to 110	110		126.
Total indicated horsepower of propelling engines.	310, combined	278		344.
Average speed:				
Light	7.6 knots	8.25 knots	11.75 knots	8 knots.
Loaded	6.6 knots	6.5 knots		5 knots.
While dredging	0.88 knots	3 knots		2 knots.
Number and type of boilers	2-tubular	1 Scotch	4 Scotch; 2 double and 2 single end.	1 Scotch.

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Dimensions of boilers:				
Diameter	11 feet	12 feet	17 feet and 12 feet	10 feet 6 inches.
Length	12 feet 3 inches	13 feet	14 feet 1 inch	11 feet 8 inches.
Boiler pressure (gauge)	80 pounds	100 pounds	150 pounds	120 pounds.
Number of men in crew	22 to 21	27		16.
Operations.				
Location of dredging	Newport, R. I., district	(a) Ship Island Pass, (b) Horn Island Pass, (c) Mobile Outer Bar, (d) Mobile ship channel.	Portland, Oreg., Columbia River.	(a) Cape Fear River below Wilmington, (b) Beaufort Inlet, N. C.
Average depth before dredging	18 to 25 feet	(a) 22 feet, (b) 19 to 22 feet, (c) 18 to 24 feet.		(a) 20 to 22 feet, (b) 14.7 feet.
Average depth after dredging	25 feet	(a) 26 feet, (b) 22 to 23 feet, (c) 30 feet.		(a) 20 to 22 feet, (b) 20 feet.
Character of dredged material	Soft mud, clay, mud, sand, shells, cobbles, bowlders.	Sand and mud		Mud, sand, and shells.
Average distance from work to dump	5.9 miles	One-half mile		About 2 miles.
Material dredged during year	165,791 cubic yards	757,133 cubic yards		320,623 cubic yards.
Total number of loads	311	3,938		1,130.
Average amount per load	533 cubic yards	192.3 cubic yards		269.35 cubic yards.
Average number of loads dredged daily	2.2	16		5.55.
Average amount dredged:				
Daily	1,192 cubic yards	3,077 cubic yards		1,474.1 cubic yards.
Per hour	312 cubic yards	646.6 cubic yards		222.1 cubic yards.
DISTRIBUTION OF TIME.				
Number days on which any dredging was done.	139 days	246 days		235 days.
Number of hours dredging	531 hours 14 minutes	1,170 hours 30 minutes		1,443 hours 17 minutes.
Number hours going to and from dump	438 hours 26 minutes	826 hours 32 minutes		681 hours 30 minutes.
Number hours going to and from wharf or anchorage.	336 hours 15 minutes	524 hours		251 hours 34 minutes.
Number hours taking coal and water	298 hours 7 minutes	188 hours 18 minutes		138 hours 27 minutes.
Number hours dumping	124 hours 12 minutes	227 hours 27 minutes		140 hours 17 minutes.
Hours lost account of weather	531 hours 46 minutes	294 hours 18 minutes		194 hours 32 minutes.
Hours lost account of repairs:				
Ordinary	14 hours 41 minutes	274 hours 10 minutes		76 hours 27 minutes.
Extraordinary	1,053 hours 56 minutes	158 hours		51 days.
Hours lost account alterations and additions.	42 hours			
Number hours turning in cut, and miscellaneous causes.	221 hours 13 minutes	121 hours 18 minutes		111 hours.
Average time to dredge one load	1 hour 42 minutes	17.5 minutes		1 hour 16 minutes.
Average time to dump one load	24 minutes	3.5 minutes		7.5 minutes.
Average time spent going to and from dump per load.	1 hour 25 minutes	12.5 minutes		36 minutes.

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TABLE I.—*Performances of United States seagoing dredges for the fiscal year ending June 30, 1910*—Continued.

Name	*Gedney.*		*Charleston.*		*Chinook.*	*Cape Fear.*	
DISTRIBUTION OF COST AND PERCENTAGE OF TOTAL COST.	Amount.	Per cent.	Amount.	Per cent.		Amount.	Per cent.
Pay roll	$14,122.55	38.60	$16,894.49	42.30		$8,678.07	22.85
Coal	5,349.13	14.70	5,262.04	13.35		6,508.41	18.30
Water	135.25	.36	6.75	.02		97.13	.28
Supplies:							
Subsistence	4,159.60	11.40	3,779.14	9.52		2,433.16	6.77
Engine room	332.47	.90	838.65	2.21		717.12	2.00
Miscellaneous	321.85	.88	737.75	1.86		260.36	.74
Renewals of or additions to outfit	269.33	.74	1,252.53	3.26		377.76	1.10
Ordinary repairs	553.05	1.52	407.00	1.22		2,311.25	6.45
Extraordinary repairs	6,920.23	18.90	9,111.76	22.65		8,906.66	24.85
Alterations and additions to vessel	2,191.34	6.00					
Laundry and miscellaneous expense, wharfage, etc	354.71	.96	244.63	.61		226.34	.64
Office expenses	1,932.75	5.30	1,185.36	2.98		[a] 4,669.93	12.95
Surveys						758.82	2.11
Total cost	36,642.26		39,720.10			35,945.01	
Cost per cubic yard with no repairs or additions.	$0.1627		$0.0356			$0.0771.	
Cost per cubic yard with ordinary repairs.	$0.1659		$0.0387			$0.0843.	
Total cost per cubic yard	$0.221		$0.0524			$0.1121.	
MISCELLANEOUS.							
Fuel consumed during year	1,582 tons coal		1,478.1 tons coal			1,895.7 tons coal.	
Average cost of fuel per ton	$3.38 per ton		$3.56 per ton			$3.67 per ton.	
Number of pounds of fuel consumed per yard of dredged material.	21.4 pounds coal		4.4 pounds coal			14.4 pounds coal.	
Water, cost per 1,000 gallons	$0.25		$4.16				
Water purchased during year	53,000 gallons		1,620 gallons				
	Remarks.				*Remarks.*	*Remarks.*	
	Cubic yards of material dredged during year in—				Undergoing extensive repairs and alterations.	[a] Includes repairs to windmill, storehouse, small boats, etc.	
	Newport Harbor, R. I.	8,858					
	Entrance to channel, Nantucket Harbor	32,874					
	Great Salt Pond Harbor entrance, Block Island	716					
	Providence River, R. I.	20,285					
	Fall River Harbor, Mass	86,046					
	New Bedford and Fairhaven harbors, Massachusetts	17,012					
		165,791					

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Name	*Gen. C. B. Comstock.*	*Winyah Bay.*	*Benyaurd.*	*Sabine.*
Where built	Perth Amboy, N. J.	Wilmington, Del.	Richmond, Va.	New York, N. Y.
When built	1895.	1898.	1900.	1901.
Builder	Bucyrus Steam Shovel Co.	Bucyrus Steam Shovel Co.	Wm. R. Trigg Co.	Townsend & Downey.
Contract cost	$86,000.	$73,800.	$286,605.	$90,290.[a]
Cost of outfit	$10,000.	$12,200.	$127,633.37 [a].	
Time to build	10 months.	1 year and 2 months.		10 months.
Material of hull	Wood.	Wood.	Steel.	Wood.
Length over all	177 feet.	141 feet.	271 feet 6 inches.	145 feet.
Length between perpendiculars	165 feet.	130 feet.	260 feet.	137 feet.
Beam	35 feet 6 inches.	31 feet 6 inches.	47 feet.	35 feet.
Depth amidship	16 feet.	13 feet 5 inches.	21 feet 6 inches.	12 feet.
Drafts, light:				
Forward	7 feet 6 inches.	7 feet.	10 feet 10 inches.	7 feet 6 inches.
Aft	13 feet 6 inches.	9 feet 8 inches.	12 feet 2 inches.	9 feet 8 inches.
Drafts, loaded:				
Forward	14 feet.	13 feet.	19 feet.	9 feet 10 inches.
Aft	14 feet 6 inches.	do.	20 feet.	12 feet 5 inches.
Displacement:				
Light	1,100 tons.	466 tons.	2,978 tons.	750 tons.
Loaded	1,900 tons.	833 tons.	5,436 tons.	1,100 tons.
Number of hoppers	2.	2.	2.	2.
Total capacity of hoppers	643.3 cubic yards.	300 cubic yards.	2,253 cubic yards.	325 cubic yards.
Number of drags	2.	1.	2.	2.
Number, size, and type:				
Dredging pumps	Two 15-inch centrifugal.	One 15-inch centrifugal.	Two 20-inch centrifugal.	Two 10-inch centrifugal.
Pumping engines	Two 12 x 22 x 14 inch compound.	One 12 x 22 x 14 inch compound.	Two 16 x 32 x 20 inch compound.	Two 10 x 11 inch stroke, simple.
Revolutions per minute of pumping engines.	195.	250.	150.	260.
Total indicated horsepower of pumping engines.	340.	208.	722.	208.
Number, type, size, propelling engines	One 20 x 36 x 26 inch compound.	One 17 x 32 x 24 inch compound.	Two 20 x 40 x 30 inch compound.	Two 13 x 27 x 18 inch compound.
Revolutions per minute of propelling engines:				
Light	106.	125.	140.	123.
Loaded	98.	110.	130.	117.
Total indicated horsepower of propelling engines.	514.	355.	1,500.	360.
Average speed:				
Light	9.5 knots.	9 knots.	10 knots.	8.2 knots.
Loaded	8 knots.	7 knots.	8 knots.	7.5 knots.
While dredging	2 knots.	1 to 2 knots.	0.5 knots.	3.5 knots.
Number and type of boilers	2 Scotch.	1 Scotch.	4 Scotch, return tubular type.	2 Scotch marine
Dimensions of boilers:				
Diameter	10 feet.	13 feet 6 inches.	13 feet 6 inches.	10 feet.
Length	11 feet.	12 feet.	12 feet.	11 feet.
Boiler pressure (gauge)	115 pounds.	110 pounds.	120 pounds.	118 pounds.
Number of men in crew	43.	20.	61.	17.

[a] See remarks, page 2455.

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TABLE I.—*Performances of United States seagoing dredges for the fiscal year ending June 30, 1910*—Continued.

Name	*Gen. C. B. Comstock.*	*Winyah Bay.*	*Bonneau.*	*Sabine.*
Operations.				
Location of dredging	Galveston Outer Bar, Galveston Channel, and Bolivar Channel.	(a) Charleston Harbor, (b) Winyah Bay, S. C.	Southwest Pass, Mississippi River.	Sabine Pass Jetty Channel, Tex., and La.
Average depth before dredging	Varied at different channels	(a) 19 to 21 feet, (b) 12 feet 5 inches to 14 feet.	21 feet	Approximately 23.5 feet.
Average depth after dredging	do	(a) 23 to 26 feet, (b) 14 to 15 feet.	30 feet	24.5 feet.
Character of dredged material	Sand, clay, shell, and mud	(a) Hard mud and coral rock, (b) Soft mud.	Sand and mud	Soft blue mud.
Average distance from work to dump	1 mile	(a) 1 to 3 miles, (b) 1 to 5 miles	2 miles	2.5 miles.
Material dredged during year	1,351,816 cubic yards	112,809 cubic yards	1,794,974 cubic yards	437,132.5 cubic yards.
Total number of loads	2,333	409	1,461	1,913.
Average amount per load	580 cubic yards	272.7 cubic yards	1,228.6 cubic yards	228.5 cubic yards.
Average number of loads dredged daily	12.7	5	6.45	8.8.
Average amount dredged:				
Daily	7,660 cubic yards	1,566 cubic yards	7,924.47 cubic yards	2,014.4 cubic yards.
Per hour	497 cubic yards	288 cubic yards	588.9 cubic yards	472 cubic yards.
DISTRIBUTION OF TIME.				
Number days on which any dredging was done.	180 days	72. days	222 days	217 days.
Number of hours dredging	2,719 hours 45 minutes	391 hours	3,048 hours 48 minutes	925 hours 4 minutes.
Number hours going to and from dump	506 hours 26 minutes	236 hours 55 minutes	216 hours 31 minutes	699 hours 25 minutes.
Number hours going to and from wharf or anchorage.	51 hours 30 minutes	85 hours 20 minutes	37 hours 35 minutes	380.
Number hours taking coal and water	111 hours 20 minutes	23 hours 10 minutes	243 hours	69 hours 20 minutes.
Number hours dumping	154 hours 36 minutes	14 hours 25 minutes	71 hours 11 minutes	155 hours 15 minutes.
Hours lost account of weather	108 hours 22 minutes	16 hours 55 minutes	9 hours 40 minutes	432 hours 35 minutes.
Hours lost account of repairs:				
Ordinary	493 hours 46 minutes	31 hours		235 hours 15 minutes.
Extraordinary	2,706 hours 55 minutes	General overhaul, July 28 to Sept. 22.	1,944 hours	328 hours.
Number hours turning in cut, and miscellaneous causes.	152 hours 20 minutes	24 hours	1,701 hours 15 minutes	103 hours 25 minutes.
Average time to dredge one load	1 hour 10 minutes	1 hour 3 minutes	2 hours 5 minutes	30 minutes.
Average time to dump one load	4 minutes	1¼ minutes	3 minutes	49 minutes.
Average time spent going to and from dump per load.	13 minutes	1 hour 18 minutes	8.8 minutes	22 minutes.

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DISTRIBUTION OF COST AND PERCENTAGE OF TOTAL COST.	Amount.	Per cent.	Amount.	Per cent.	Amount.	Per cent.	Amount.	Per cent.
Pay roll	$16,916.70	20.25	$5,017.50	29.20	$33,206.05	28.20	$10,279.93	38.40
Coal	[a] 17,432.55	20.85	1,931.90	11.24	35,970.57	30.60	6,472.07	24.20
Water	249.14	.29	110.25	.65			374.55	1.40
Supplies:								
Subsistence	4,881.18	5.84	737.05	4.29	10,052.66	8.54	2,316.37	8.65
Engine room	2,001.00	2.39	472.71	2.75	2,934.36	2.49	1,013.16	3.79
Miscellaneous	2,954.36	3.53	218.13	1.28	3,636.95	3.09		
Renewals of or additions to outfit	84.42	.10			5,621.21	4.78	393.87	1.46
Ordinary repairs	2,088.47	2.50	52.60	.32	1,982.34	1.68	742.23	2.77
Extraordinary repairs	22,118.92	26.50	7,139.15	41.55	20,803.00	17.70	3,852.94	14.35
Alterations and additions to vessel	5,471.08	6.55			1,057.00	.90		
Laundry and miscellaneous expense, wharfage, etc	443.29	.54	231.99	1.34	459.91	.38	680.83	2.55
Office expenses	4,057.47	4.85	1,267.92	7.38	2,028.00	1.73	639.50	2.39
Surveys	[b] 5,046.82							
Total cost	83,745.40		17,179.20		117,752.05		26,765.45	
Cost per cubic yard with no repairs or additions.	$0.0373		$0.0908		$0.0523		$0.0507.	
Cost per cubic yard with ordinary repairs.	$0.0415		$0.0912		$0.0534		$0.0524.	
Total cost per cubic yard	$0.0619		$0.1545		$0.0657		$0.0612.	
MISCELLANEOUS.								
Fuel consumed during year	15,638.47 barrels oil		445 tons coal		8,300.9 tons coal		6,859.04 barrels oil.	
Average cost of fuel per ton	$1.10 to $1.50 per barrel		$4.34 per ton		$4.33⅓ per ton		$0.9435 per barrel.	
Number of pounds of fuel consumed per yard of dredged material.	0.485 gallon oil		8.83 pounds coal		10.3 pounds coal		0.658 gallon oil.	
Water, cost per 1,000 gallons	$0.0275		$1.32					
Water purchased during year	903,988 gallons		83,800 gallons					

Remarks.

[a] Oil fuel.
[b] No survey cost—this includes expense of tender, $669.77, and Fort Point expenses, $4,377.05.

Remarks.

[a] Includes finishing at Norfolk navy-yard due to failure Trigg Co., of Richmond, Va., the contractors.

Remarks.

Oil fuel used.

[a] Contract price	$87,900.00
Extra (copper sheathing)	2,790.00
Total	90,290.00
Amount deducted for failure to deliver on time	5,436.60
Actual cost	84,833.40

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TABLE I.—*Performances of United States seagoing dredges for the fiscal year ending June 30, 1910*—Continued.

Name	*Cumberland.*	*General Meade.*	*Manhattan.*	*Atlantic.*
Where built	Belfast, Me.	Sparrows Point, Md.	Sparrows Point, Md.	Sparrows Point, Md.
When built	1902.	1904.	1904.	1904.
Builder	Geo. A. Gilchrist.	Maryland Steel Co.	Maryland Steel Co.	Maryland Steel Co.
Contract cost	$144,750 a.	$165,000.	$304,000 a.	$304,000.a
Cost of outfit	$13,700.12.	$12,953.	$37,577.24.	$37,577.24.
Time to build	1 year and 1 month.	1 year and 3 months.	1 year and 9 months.	1 year and 9 months.
Material of hull	Wood.	Steel.	Steel.	Steel.
Length over all	200 feet.	177 feet.	288 feet.	288 feet.
Length between perpendiculars	183 feet.	166 feet.	274 feet.	274 feet.
Beam	40 feet 8 inches.	38 feet.	47 feet 6 inches.	47 feet 7 inches.
Depth amidship	20 feet 6 inches.	19 feet.	25 feet.	25 feet.
Drafts, light:				
Forward	13 feet 5 inches.	9 feet.	10 feet 6 inches.	10 feet 6 inches.
Aft	14 feet 3 inches.	12 feet.	12 feet 6 inches.	12 feet 6 inches.
Drafts, loaded:				
Forward	20 feet 5 inches.	19 feet.	21 feet 6 inches.	21 feet.
Aft	19 feet 5 inches.	17 feet.	do.	21 feet 6 inches.
Displacement:				
Light	1,905 tons.	1,633 tons.	3,140 tons.	3,140 tons.
Loaded	3,577 tons.	2,908 tons.	6,440 tons.	6,420 tons.
Number of hoppers	2.	2.	2.	2.
Total capacity of hoppers	1,050 cubic yards.	935 cubic yards.	2,476 cubic yards.	2,476 cubic yards.
Number of drags	2.	2.	2.	2.
Number, size, and type:				
Dredging pumps	Two 18-inch centrifugal.	Two 15-inch centrifugal.	Two 20-inch centrifugal.	Two 20-inch centrifugal.
Pumping engines	Two 14 x 26 x 16 inch compound.	Two 11 x 22 x 24 inch compound.	Two 16 x 32 x 18 inch compound.	Two 16 x 32 x 18 inch compound.
Revolutions per minute of pumping engines.	196.	230.	160.	165.
Total indicated horsepower of pumping engines.	584.	582.	670.	686.
Number, type, size, propelling engines	One 22 x 44 x 30 inch compound.	Two 15 x 30 x 24 inch compound.	Two 22 x 44 x 30 inch compound.	Two 22 x 44 x 30 inch compound.
Revolutions per minute of propelling engines:				
Light	107.	110.	104.	108.
Loaded	97.	100.	98.	104.
Total indicated horsepower of propelling engines.	763.	560.	1,390.	1,412.
Average speed:				
Light	10.15 knots.	8.5 knots.	8.8 knots.	10 knots.
Loaded	8 knots.	7 knots.	7.2 knots.	7.8 knots.
While dredging	1 to 2 knots.	1.5 knots.	1 to 3 knots.	1 to 3 knots.
Number and type of boilers	2 Scotch.	2 Scotch.	4 Scotch.	4 Scotch.

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Dimensions of boilers:				
Diameter	14 feet	12 feet	14 feet	14 feet.
Length	12 feet	13 feet	12 feet	12 feet.
Boiler pressure (gauge)	120 to 125 pounds	120 pounds	116 pounds	112 and 115 pounds.
Number of men in crew	35	37	57	57.
Operations.				
Location of dredging	(a) Outer bar, (b) Tybee Roads, (c) Long Island Crossing, (d) Tybee Knoll.	Harbors on east shore of Lake Michigan.	Ambrose channel, New York Harbor, N. Y.	Ambrose channel, New York Harbor, N. Y.
Average depth before dredging	(a) 19.5 feet, (b) 21.35 feet, (c) 20 feet, (d) 20 feet.	12 to 18 feet	20 to 40 feet	20 to 40 feet.
Average depth after dredging	(a) 26 feet, (b) 24.8 feet, (c) 23 feet, (d) 23.3 feet.	16 to 22 feet	25 to 42 feet	25 to 42 feet.
Character of dredged material	(a and c) Sand, clay, mud; (b and d) sand, clay, mud, and gravel.	Sand, clay, gravel, stones	Fine compact sand, 20 per cent; coarse sand, 60 per cent; stones and shells, 5 per cent; mud, 15 per cent.	Sand, mud, stones, and shells.
Average distance from work to dump	(a) 1 mile, (b) 1 to 3 miles, (c) ½ to 3 miles, (d) 1.5 to 3 miles.	1 to 2 miles	7 to 12 miles	7 to 12 miles.
Material dredged during year	866,946 cubic yards	486,102 cubic yards	2,235,627 cubic yards	2,217,618 cubic yards.
Total number of loads	1,000	938	1,088	1,086.
Average amount per load	866.9 cubic yards	518.23 cubic yards	2,055 cubic yards	2,042 cubic yards.
Average number of loads dredged daily	4.45	4.95	3.73	3.87.
Average amount dredged:				
Daily	3,897.47 cubic yards	2,558.44 cubic yards	7,656 cubic yards	7,892 cubic yards.
Per hour	634.84 cubic yards	416.18 cubic yards	712.3 cubic yards	693.2 cubic yards.
DISTRIBUTION OF TIME.				
Number days on which any dredging was done.	226 days	190 days	292 days	281 days.
Number of hours dredging	1,383 hours 19 minutes	1,168 hours	3,138 hours 15 minutes	3,198 hours 55 minutes.
Number hours going to and from dump	436 hours 5 minutes	304 hours	1,908 hours 35 minutes	1,671 hours 30 minutes.
Number hours going to and from wharf or anchorage.	352 hours 31 minutes	116 hours	122 hours 25 minutes	145 hours 55 minutes.
Number hours taking coal and water	213 hours 8 minutes	422 hours	592 hours 40 minutes	578 hours.
Number hours dumping	200 hours 14 minutes	82 hours	190 hours 40 minutes	187 hours 55 minutes.
Hours lost account of weather	69 hours 7 minutes	346 hours	321 hours 15 minutes	376 hours 40 minutes.
Hours lost account of repairs:				
Ordinary	421 hours 3 minutes	74 hours	535 hours 45 minutes	669 hours 15 minutes.
Extraordinary	217 hours 7 minutes	14 hours		
Hours lost account alterations and additions.	57 hours			
Number hours turning in cut, and miscellaneous causes.	344 hours 50 minutes	6,234 hours	510 hours 15 minutes	491 hours 50 minutes.
Average time to dredge one load	1 hour 23 minutes	1 hour 16 minutes	2 hours 53 minutes	2 hours 57 minutes.
Average time to dump one load	12 minutes	5 minutes	11 minutes	10 minutes.
Average time spent going to and from dump per load.	26 minutes	20 minutes	1 hour 45 minutes	1 hour 33 minutes.

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TABLE I.—*Performances of United States seagoing dredges for the fiscal year ending June 30, 1910*—Continued.

Name	*Cumberland.*		*General Meade.*		*Manhattan.*		*Atlantic.*	
DISTRIBUTION OF COST AND PERCENTAGE OF TOTAL COST.	Amount.	Per cent.	Amount.	Per cent.	Amount.	Per cent.	Amount.	Per cent.
Pay roll	$20,217.74	33.30	$22,239.97	46.76	$34,534.16	30.74	$24,736.46	21.89
Coal	12,718.42	20.90	11,596.88	24.40	33,174.94	29.53	28,947.71	26.49
Water	228.60	.37			521.49	.47	604.57	.55
Supplies:								
Subsistence	5,959.61	9.81	5,567.63	11.70	9,870.00	8.80	10,415.49	9.50
Engine room	1,913.01	3.14	1,003.78	2.10	2,650.00	2.36	2,783.80	2.54
Miscellaneous	1,010.07	1.66	667.02	1.40	2,820.00	2.51	2,521.21	2.40
Renewals of or additions to outfit	49.50	.08	269.39	.56	7,420.00	6.61	8,788.00	8.00
Ordinary repairs	6,207.02	10.20	2,216.55	4.65	12,110.00	10.78	11,819.83	10.82
Extraordinary repairs	6,061.05	9.96	1,287.71	2.70				
Alterations and additions to vessel			611.89	2.18				
Laundry and miscellaneous expense, wharfage, etc	600.12	.99	250.29	.52	1,760.00	1.56	1,632.23	1.49
Office expenses	5,819.61	9.58	1,828.75	3.84	2,808.00	2.88	2,808.00	2.64
Surveys					4,565.00	4.06	4,565.00	4.16
Total cost	60,784.75		47,539.86		112,323.59		109,712.30	
Cost per cubic yard with no repairs or additions.	$0.0559		$0.0893		$0.0448		$0.0448.	
Cost per cubic yard with ordinary repairs.	$0.063		$0.0938		$0.0502		$0.0494.	
Total cost per cubic yard	$0.0701		$0.0978		$0.0502		$0.0494.	
MISCELLANEOUS.								
Fuel consumed during year	3,337.1 tons coal		2,906.13 tons coal		11,677 tons coal		10,218 tons coal.	
Average cost of fuel per ton	$3.811 per ton		$3.99 per ton		$2.84 per ton		$2.82 to $3.11 per ton.	
Number of pounds of fuel consumed per yard of dredged material.	8.6 pounds coal		13.35 pounds coal		11.7 pounds coal		10 pounds coal.	
Water, cost per 1,000 gallons	One-half cent				25 cents		25 cents.	
Water purchased during year	45,700 gallons				2,085,953 gallons		2,418,273 gallons.	
	Remarks.				*Remarks.*		*Remarks.*	
	a $23,423.92 to be added to contract post for sheathing bottom with copper, etc.				a Inclusive of lost time installing drag, suction pipes, etc., before operation could be undertaken, the total cost was $361,500.		a Total cost due to changes while building, including outfit, etc., was $361,500.	

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Name.	*Key West.*	*Savannah.*	*Sumter.*	*Burton.*
Where built	Belfast, Me.	Sparrows Point, Md.	Petersburg, Va.	Sparrows Point, Md.
When built	1904.	1904.	1904.	1905.
Builder	George A. Gilchrist.	Maryland Steel Co.	Petersburg Iron Works.	Maryland Steel Co.
Contract cost	$91,000.	$175,500.	$191,560.	$165,000.
Cost of outfit	$10,708.	$19,585.08.		$19,300.
Time to build	1 year and 5 months.	1 year and 7 months.	2 years.	1 year and 4 months.
Material of hull	Wood.	Steel.	Wood.	Steel.
Length over all	142 feet.	177 feet.	200 feet.	177 feet.
Length between perpendiculars	136 feet.	166 feet.	185 feet.	166 feet.
Beam	36 feet.	38 feet.	41 feet.	38 feet.
Depth amidship	14 feet 8 inches.	19 feet.	20 feet.	19 feet.
Drafts, light:				
Forward	11 feet 8 inches.	10 feet.	13 feet.	8 feet 10 inches.
Aft	11 feet 6 inches.	17.5 feet.	13 feet 9 inches.	11 feet.
Drafts, loaded:				
Forward	17 feet.	18 feet.	21 feet.	17 feet 6 inches.
Aft	15 feet.	17 feet.	do.	17 feet 3 inches.
Displacement:				
Light	1,000 tons.	1,461 tons.	1,706.22 tons.	1,510 tons.
Loaded	1,600 tons.	2,950 tons.	2,664.09 tons.	2,795 tons.
Number of hoppers	1.	2.	2.	2.
Total capacity of hoppers	369 cubic yards.	935 cubic yards.	990 cubic yards.	935 cubic yards.
Number of drags	1.	2.	2.	2.
Number, size, and type:				
Dredging pumps	One 15-inch centrifugal.	Two 15-inch centrifugal.	Two 18-inch centrifugal.	Two 15-inch centrifugal.
Pumping engines	One 12 x 22 x 14 inch compound.	Two 12 x 22 x 14 inch compound.	Two 14 x 26 x 18 inch compound.	Two 12 x 22 x 14 inch compound.
Revolutions per minute of pumping engines.	210.	245.	201.	230.
Total indicated horsepower of pumping engines.	170.	466.	600.	374.
Number, type, size, propelling engines.	One 17.5 x 32 x 24 inch compound.	Two 15 x 30 x 24 inch compound.	One 22 x 44 x 30 inch compound.	Two 15 x 30 x 24 inch compound.
Revolutions per minute of propelling engines:				
Light	106.	109.	98.	106.
Loaded	102.	98.	82.	96.
Total indicated horsepower of propelling engines.	310.	582.	645.	480.
Average speed:				
Light	7 knots.	9.25 knots.	8 knots.	7 knots.
Loaded	5 knots.	7.74 knots.	5 knots.	3.5 knots.
While dredging	2 knots.	1 to 2 knots.	1.5 to 2 knots.	1.5 knots.
Number and type of boilers	1 Scotch, return tubular.	2 Scotch.	2 Scotch type.	2 Scotch.
Dimensions of boilers:				
Diameter	13 feet 6 inches.	13 feet.	14 feet.	13 feet.
Length	12 feet.	12 feet.	12 feet.	12 feet.
Boiler pressure (gauge)	112 pounds.	120 to 125 pounds.	115 pounds.	108 pounds.
Number of men in crew	23.	34.	36.	28.

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TABLE I.—*Performances of United States seagoing dredges for the fiscal year ending June 30, 1910*—Continued.

Name	*Key West.*	*Savannah.*	*Sumter.*	*Burton.*
Operations.				
Location of dredging	Tampa Bay, Key West, St. Johns River.	(a) Tybee Roads, (b) Long Island Crossing, (c) Lower Flats, (d) Upper Flats, (e) obstructions, (f) Tybee Knoll, (g) Outer bar, (h) quarantine.	South and Southwest passes, Mississippi River.	(a) Toledo Harbor, (b) Outer Division, (c) Straight channel and Division channel and entrance, Maumee River, (d) Sandusky Outer Bar, Straight and Dock channels, (e) Huron, entrance, (f) Conneaut channel and entrance, (g) Fairport entrance, (h) Lorain channel and entrance.
Average depth before dredging	15 to 24 feet	(a) 21.3 feet, (b) 20 feet, (c) 22 feet, (d) 21.9 feet, (e) 18 feet, (f) 20 feet, (g) 19.5 feet, (h) 19 feet.	South Pass, 29 feet; Southwest Pass, 21 feet.	(a)
Average depth after dredging	17 to 26 feet	(a) 24.7 feet, (b) 23.2 feet, (c) 23 feet, (d) 22.5 feet, (e) 22 feet, (f) 23.5 feet, (g) 26 feet, (h) 20 feet.	South Pass, 31 feet; Southwest Pass, 30 feet.	(a)
Character of dredged material	Sand, shell, mud, coral, sand	(a, c, f, g) Sand and clay, (b) sand and slush, (d, e, h) coarse sand.	Sand, mud, and clay	Fine sand, mud, clay, and small stones.
Average distance from work to dump	One-half to 6 miles	(a)	1 to 3.5 miles	(b)
Material dredged during year	458,013 cubic yards	837,337 cubic yards [b]	435,443 cubic yards	290,720 cubic yards.
Total number of loads	1,303	1,025	555	422.
Average amount per load	351.5 cubic yards	816.91 cubic yards	784.58 cubic yards	688.9 cubic yards.
Average number of loads dredged daily	5.95	4.8	3.7	2.363.
Average amount dredged:				
Daily	2,091.4 cubic yards	3,931.16 cubic yards	2,923.43 cubic yards	1,624.02 cubic yards.
Per hour	304.5 cubic yards	631.11 cubic yards	447 cubic yards	310.78 cubic yards.
DISTRIBUTION OF TIME.				
Number days on which any dredging was done.	219 days	213 days	149 days	179 days.
Number of hours dredging	1,160 hours 50 minutes	1,326 hours 45 minutes	974 hours 16 minutes	967 hours 54 minutes.
Number hours going to and from dump	651 hours 25 minutes	419 hours 30 minutes	303 hours 29 minutes	497 hours 43 minutes.
Number hours going to and from wharf or anchorage.	421 hours 35 minutes	255 hours 41 minutes	156 hours 46 minutes	115 hours 4 minutes.
Number hours taking coal and water	252 hours 15 minutes	221 hours 48 minutes	106 hours 33 minutes	60 hours 45 minutes.
Number hours dumping	124 hours 20 minutes	185 hours 51 minutes	93 hours 17 minutes	25 hours 46 minutes.
Hours lost account of weather	73 hours 20 minutes	53 hours 9 minutes	90 hours 55 minutes	69 hours 27 minutes.
Hours lost account of repairs:				
Ordinary	249 hours 50 minutes	136 hours 16 minutes	97 hours 17 minutes	84 hours 29 minutes.
Extraordinary	277 hours 15 minutes	113 hours 57 minutes	1,342 hours 58 minutes	
Hours lost account alterations and additions.	4 hours 5 minutes			

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Number hours turning in cut, and miscellaneous causes.	430 hours 5 minutes		244 hours 25 minutes		579 hours 19 minutes		239 hours 57 minutes.	
Average time to dredge one load	53.5 minutes		1 hour 17 minutes		1 hour 45 minutes		2 hours 13 minutes.	
Average time to dump one load	5.7 minutes		11 minutes		10.08 minutes		24 minutes.	
Average time spent going to and from dump per load.	30 minutes		24.5 minutes		32.8 minutes		43 minutes.	
DISTRIBUTION OF COST AND PERCENTAGE OF TOTAL COST.	Amount.	Per cent.	Amount.	Per cent.	Amount.	Per cent.	Amount.	Per cent.
Pay roll	$13,660.50	33.21	$17,156.03	27.00	$20,210.54	24.31	$14,775.01	54.99
Coal	8,643.30	21.01	10,910.89	17.20	10,135.01	12.19	6,284.29	23.39
Water	313.17	.76	289.00	.45	439.75	.53		
Supplies:								
Subsistence	4,135.42	10.05	4,681.28	7.37	5,682.45	6.84	3,336.35	12.43
Engine room	1,403.28	3.41	1,586.35	2.50	1,644.28	1.98	263.49	.98
Miscellaneous	926.06	2.25	2,025.14	3.19	896.05	1.08	153.53	.58
Renewals of or additions to outfit	1,650.28	4.01			2,537.59	3.05	190.20	.71
Ordinary repairs	542.59	1.31	2,493.91	3.93	8.78	.01	1,608.45	5.98
Extraordinary repairs	7,250.11	17.62	17,739.03	27.90	39,559.33	47.60		
Alterations and additions to vessel					89.97	.11		
Laundry and miscellaneous expense, wharfage, etc.	612.90	1.49	567.32	.89	910.41	1.09	254.45	.94
Office expenses	1,994.42	4.84	6,175.24	9.70	1,004.43	1.21		
Total cost	41,132.03		63,624.19		83,118.59		26,865.77	
Cost per cubic yard with no repairs or additions.	$0.0728		$0.0522		$0.0965		$0.0868.	
Cost per cubic yard with ordinary repairs.	$0.0739		$0.0548		$0.0965		$0.0924.	
Total cost per cubic yard	$0.0898		$0.0759		$0.1835		$0.0924.	
MISCELLANEOUS.								
Fuel consumed during year	1,839 tons coal		2,866.75 tons coal		2,293 tons coal		2,442.45 tons coal.	
Average cost of fuel per ton	$4.70 per ton		$3.80 per ton		$4.42 per ton		$2.572 per ton.	
Number of pounds of fuel consumed per yard of dredged material.	9 pounds coal		7.8 pounds coal		11.8 pounds coal		20.49 pounds coal.	
Water, cost per 1,000 gallons	$2.379		$5		$5			
Water purchased during year	131,555 gallons		57,800 gallons		87,960 gallons			

Remarks.

[a] Distance from work to dump (a) 3 to 5 miles, (b) 1 to 3 miles, (c) 1 mile, (d) 2 to 4 miles, (e) 6 miles, (f) 1 to 1.5 miles, (g) 2 miles, (h) 1.5 miles.

[b] Cubic yards of material dredged during year: (a) 265,900, (b) 30,410, (c) 75,960, (d) 56,988, (e) 4,675, (f) 247,346, (g) 99,258, (h) 56,800.

Remarks.

[a] The work of the Burton is mainly in the nature of maintenance and emergency dredging at a number of harbors, which requires that the dredge be held in readiness whether there is any work to be done or not.

[b] (a, b) 3 miles, (c) 15 miles, (d) 3 miles, (e) 1.5 miles, (f, g, h) 1 mile.

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TABLE I.—*Performances of United States seagoing dredges for the fiscal year ending June 30, 1910*—Continued.

Name	*Cascus.*	*Delaware.*	*St. Johns.*	*Nescsink.*
Where built	Greenport, N. Y.	Sparrow Point, Md	Greenport, N. Y.	Sparrow Point, Md.
When built	1905.	1905.	1905.	1908.
Builder	James Reilly Rep. and Sup. Co.	Maryland Steel Co.	James Reilly Rep. and Sup. Co.	Maryland Steel Co.
Contract cost	$150,000.	$358,400.	$150,000.	$371,425.
Cost of outfit	$26,000.	$33,734.	$26,000.	$12,704.28.
Time to build	2 years and 7 months.	2 years and 2 months.	2 years.	1 year and 1 month.
Material of hull	Wood.	Steel.	Wood.	Steel.
Length over all	200 feet.	315 feet.	200 feet.	290 feet.
Length between perpendiculars	185 feet.	300 feet.	185 feet.	276 feet.
Beam	41 feet.	52 feet.	41 feet.	47 feet 7 inches.
Depth amidship	23 feet 2 inches.	22 feet 6 inches.	20 feet.	28 feet.
Drafts, light:				
Forward	13 feet 6 inches.	11 feet 10 inches.	13 feet.	12 feet.
Aft	14 feet 6 inches.	12 feet 6 inches.	13 feet 6 inches.	14 feet.
Drafts, loaded:				
Forward	19 feet 6 inches.	18 feet 11 inches.	20 feet.	22 feet.
Aft	18 feet 6 inches.	17 feet 7 inches.	do.	23 feet 6 inches.
Displacement:				
Light	1,400 tons.	4,000 tons.	1,873.1 tons.	3,150 tons.
Loaded	2,680 tons.	6,440 tons.	2,881.7 tons.	7,200 tons.
Number of hoppers	2.	2.	2.	2.
Total capacity of hoppers	935 cubic yards.	3,147 cubic yards.	1,000 cubic yards.	2,884 cubic yards.
Number of drags	2.	2.	2.	2.
Number, size, and type:				
Dredging pumps	Two 18-inch centrifugal.	Two 20-inch centrifugal.	Two 18-inch centrifugal.	Two 20-inch centrifugal.
Pumping engines	Two 14 x 26 x 18 inch compound.	Two 16 x 32 x 18 inch compound.	Two 14 x 26 x 18 inch compound.	Two 17 x 36 x 18 inch compound.
Revolutions per minute of pumping engines.	185.	162.	175.	155.
Total indicated horsepower of pumping engines.	530.	680.	500.	776.
Number, type, size, propelling engines	One 22 x 44 x 30 inch compound.	Two 22 x 44 x 30 inch compound.	One 22 x 44 x 30 inch compound.	Two 22 x 46 x 30 inch compound.
Revolutions per minute of propelling engines:				
Light	88.	106.	100.	99.
Loaded	82.	96.	85.	93.5.
Total indicated horsepower of propelling engines.	580.	1,426.	657.	1,368.
Average speed:				
Light	9 knots.	9 knots.	9 knots.	10 knots.
Loaded	6 knots.	6 knots.	5 knots.	7.5 knots.
While dredging	1 knot.	1 to 2 knots.	1 knot.	1 to 3 knots.
Number and type of boilers	2 Scotch.	4 Scotch, return tubular type ...	2 Scotch, return tubular.	4 Scotch.

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Dimensions of boilers:				
Diameter	14 feet	14 feet	14 feet	14 feet 5 inches.
Length	12 feet	12 feet	12 feet	12 feet.
Boiler pressure (gauge)	118 pounds	118 pounds	115 pounds	118 pounds.
Number of men in crew	34	57	43	60.
Operations.				
Location of dredging	Caucus channel, Pensacola Harbor, Fla.	Delaware River	South and Southwest passes, Mississippi River.	Ambrose channel, New York Harbor.
Average depth before dredging	27 feet (width, 100 feet)	25 to 30 feet	South Pass, 29 feet; Southwest Pass, 21 feet.	20 to 40 feet.
Average depth after dredging	30 feet (width, 380 feet)	30 to 35 feet	South Pass, 31 feet; Southwest Pass, 30 feet.	25 to 42 feet.
Character of dredged material	Sand	Sand, mud, clay, gravel	Sand, mud, and clay	Fine hard sand, 20 per cent; coarse sand, 55 per cent; mud 15 per cent; stones, 10 per cent.
Average distance from work to dump	2.5 to 3 miles	5.7 miles	1 to 3.5 miles	8 to 12 miles.
Material dredged during year	381,248 cubic yards	3,842,675 cubic yards	604,686 cubic yards	2,547,130 cubic yards.
Total number of loads	398	967	827	975.
Average amount per load	957.98 cubic yards		731.17 cubic yards	2,612 cubic yards.
Average number of loads dredged daily	3.9	3.7	5.3	3.38.
Average amount dredged:				
Daily	3,835.76 cubic yards	14,796 cubic yards	3,875.48 cubic yards	8,814 cubic yards.
Per hour	860.52 cubic yards	1,127 cubic yards	540.86 cubic yards	809.6 cubic yards.
DISTRIBUTION OF TIME.				
Number days on which any dredging was done.	102	260	156	289.
Number of hours dredging	443 hours 3 minutes	3,410 hours 48 minutes	1,118 hours 47 minutes	3,146 hours.
Number hours going to and from dump	319 hours 15 minutes	705 hours 12 minutes	434 hours 43 minutes	1,754 hours 5 minutes.
Number hours going to and from wharf or anchorage.	252 hours 43 minutes	407 hours	190 hours 1 minute	195 hours 15 minutes.
Number hours taking coal and water	57 hours 26 minutes	573 hours 24 minutes	119 hours 15 minutes	577 hours 30 minutes.
Number hours dumping	29 hours 12 minutes	124 hours 36 minutes	115 hours 19 minutes	164 hours 10 minutes.
Hours lost account of weather	109 hours 5 minutes	322 hours 12 minutes	85 hours 42 minutes	267 hours 35 minutes.
Hours lost account of repairs:				
Ordinary	262 hours 12 minutes	32 hours		638 hours 55 minutes.
Extraordinary	1,424 hours	195 hours 48 minutes	953 hours	
Number hours turning in cut, and miscellaneous causes.		304 hours 18 minutes	217 hours 49 minutes	a 576 hours 30 minutes.
Average time to dredge one load	1 hour 8 minutes	3 hours 31 minutes	1 hour 21 minutes	3 hours 13 minutes.
Average time to dump one load	4½ minutes	7.8 minutes	8.5 minutes	10 minutes.
Average time spent going to and from dump per load.	48 minutes	43.8 minutes	14.5 minutes	1 hour 48 minutes.

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TABLE I.—*Performances of United States seagoing dredges for the fiscal year ending June 30, 1910*—Continued.

Name	*Caucus.*		*Delaware.*		*St. Johns.*		*Navesink.*	
DISTRIBUTION OF COST AND PERCENTAGE OF TOTAL COST.	Amount.	Per cent.	Amount.	Per cent.	Amount.	Per cent.	Amount.	Per cent.
Pay roll	[a] $11,088.11	13.46	$35,719.69	37.40	$23,265.84	40.45	$35,648.73	31.40
Coal	5,303.60	6.43	29,863.45	31.20	12,241.66	21.06	29,766.37	26.90
Water	521.37	.63					585.00	.53
Supplies:								
Subsistence	3,487.29	4.29	9,027.26	9.45	7,383.02	12.71	10,029.10	9.40
Engine room	555.52	.67	2,835.46	2.97	662.21	1.14	2,876.50	2.59
Miscellaneous	218.66	.27	2,871.19	3.00	1,177.15	2.02	2,400.55	2.27
Renewals of or additions to outfit			341.92	.36	1,337.91	2.31	18,254.94	16.60
Ordinary repairs	2,149.99	2.62	3,472.00	3.63	3.75	.05	1,714.50	1.55
Extraordinary repairs	[b] 58,322.74	70.78	9,175.14	9.60	9,062.86	15.51		
Alterations and additions to vessel			913.82	.96				
Laundry and miscellaneous expense, wharfage, etc	748.68	.91	223.18	.23	909.43	1.56	2,018.12	1.81
Office expenses			1,200.00	1.25	2,028.00	3.49	2,898.00	2.72
Surveys							4,565.00	4.22
Total cost	82,395.96		95,643.11		58,071.83		110,756.81	
Cost per cubic yard with no repairs or additions.	$0.0575		$0.0213		$0.0788		$0.0427.	
Cost per cubic yard with ordinary repairs	$0.06314		$0.0222		$0.0789		$0.0435.	
Total cost per cubic yard	$0.21612		$0.0248		$0.0960		$0.0435.	
MISCELLANEOUS.								
Fuel consumed during year	1,730.327 tons coal		9,085.5 tons coal		2,825 tons coal		10,462 tons coal.	
Average cost of fuel per ton	$3.05 per ton		$3.10 to $3.30 per ton		$4.333 per ton		$2.84 per ton.	
Number of pounds of fuel consumed per yard of dredged material.	10.16 pounds coal		5.4 pounds coal		8.46 pounds coal		9.16 pounds coal.	
Water, cost per 1,000 gallons	$1.23						25 cents.	
Water purchased during year	423,876 gallons						2,340,000 gallons.	
	Remarks.		*Remarks.*				*Remarks.*	
	[a] Part of crew laid off while dredge was being repaired. [b] Repairing broken main shaft, general overhauling and renewing stern planking.		Of the amount dredged, 1,146,162 cubic yards was dredged and dumped and 2,696,513 cubic yards was dredged and pumped overboard. The average amount per load is not given, because on account of the pumping overboard the average load would be more than the capacity of the bins.				[a] Turning in cut	Hrs. 306 mins. 35
							Monday before day	260 45
							Miscellaneous	9 10
							Total	576 30

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Name	*Raritan.*	*Clatsop.*	*Galveston.*
Where built	Sparrows Point, Md.	Newport News, Va.	Sparrows Point, Md.
When built	1908.	1908.	1908.
Builder	Maryland Steel Co.	Newport News Shipbuilding Co.	Maryland Steel Co.
Contract cost	$371,425 a.	$234,500.	$357,500.
Cost of outfit	$12,704.		$22,935.35.
Time to build	1 year and 1 month.	1 year and 4 months.	1 year and 2 months.
Material of hull	Steel.	Steel.	Steel.
Length over all	290 feet.	180 feet.	304 feet.
Length between perpendiculars	276 feet.	168 feet.	282 feet.
Beam	47 feet 7 inches.	38 feet.	51 feet.
Depth amidship	28 feet.	23 feet.	28 feet.
Drafts, light:			
Forward	12 feet 6 inches.	10 feet.	9 feet 6 inches.
Aft	14 feet 6 inches.	17 feet 6 inches.	13 feet 6 inches.
Drafts, loaded:			
Forward	23 feet.	21 feet 6 inches.	18 feet 5 inches.
Aft	23 feet 6 inches.	do.	21 feet 6 inches.
Displacement:			
Light	3,150 tons.	1,360 tons.	3,375 tons.
Loaded	7,330 tons.	3,158 tons.	7,290 tons.
Number of hoppers	2.	2.	2.
Total capacity of hoppers	2,884 cubic yards.	1,061 cubic yards.	2,850 cubic yards.
Number of drags	2.	2.	2.
Number, size, and type:			
Dredging pumps	Two 20-inch centrifugal.	Two 18-inch centrifugal.	Two 20-inch centrifugal.
Pumping engines	Two 17 x 36 x 18 inch compound.	Two 12 x 26 x 18 inch compound.	Two 17 x 36 x 18 inch compound.
Revolutions per minute of pumping engines	152.	152.	166.
Total indicated horsepower of pumping engines	724.	500.	1,000.
Number, type, size, propelling engines	Two 22 x 46 x 30 inch compound.	One 20 x 44 x 30 inch compound.	Two 20 x 46 x 30 inch compound.
Revolutions per minute of propelling engines:			
Light	105.	104.	105.
Loaded	100.	100.	105.
Total indicated horsepower of propelling engines	1,388.	900.	1,900.
Average speed:			
Light	9.1 knots.	7 knots.	11 knots.
Loaded	7.4 knots.	5 knots.	8 knots.
While dredging	1 to 3 knots.	0.5 knots.	1 knot.
Number and type of boilers	4 Scotch.	2 Scotch, return tubular.	4 Scotch, return tubular.
Dimensions of boilers:			
Diameter	14 feet 5 inches.	13 feet.	14 feet 5 inches.
Length	12 feet.	12 feet.	12 feet.
Boiler pressure (gauge)	113 pounds.	135 pounds.	145 pounds.
Number of men in crew	60.	30.	56.

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TABLE I.—*Performances of United States seagoing dredges for the fiscal year ending June 30, 1910*—Continued.

Name	*Raritan.*	*Clatsop.*	*Galveston.*
Operations.			
Location of dredging	Ambrose channel and Main ship channel, New York Harbor.	Portland, Oreg., district	Galveston Harbor, Outer Bar.
Average depth before dredging	Ambrose channel, 15 to 35 feet; Main ship channel, 25 to 30 feet.	20 feet	31 feet.
Average depth after dredging	Ambrose channel, 25 to 40 feet; Main ship channel, 28 to 30 feet.	26 feet	33.75 feet.
Character of dredged material	Sand and mud	Sand	Sand, clay, and shell.
Average distance from work to dump	8 to 12 miles	1 mile	1 mile.
Material dredged during year	2,706,024 cubic yards [b]	1,529,879 cubic yards	2,569,796 cubic yards.
Total number of loads	1,049	1,519	1,315.
Average amount per load	2,580 cubic yards	1,007.16 cubic yards	1,954 cubic yards.
Average number of loads dredged daily	3.6	6.49	4.9.
Average amount dredged:			
Daily	9,204 cubic yards	6,537.94 cubic yards	9,808 cubic yards.
Per hour	881 cubic yards	964 cubic yards	701.14 cubic yards.
DISTRIBUTION OF TIME.			
Number days on which any dredging was done	294 days	234 days	262 days.
Number of hours dredging	3,069 hours 35 minutes	1,587 hours	3,663 hours 38 minutes.
Number hours going to and from dump	2,078 hours 50 minutes	476 hours	605 hours 13 minutes.
Number hours going to and from wharf or anchorage	164 hours 35 minutes	161 hours	150 hours 55 minutes.
Number hours taking coal and water	626 hours 35 minutes	432 hours	202 hours 35 minutes.
Number hours dumping	245 hours 30 minutes	136 hours	491 hours 21 minutes.
Hours lost account of weather	294 hours	19 hours	429 hours 45 minutes.
Hours lost account of repairs:			
Ordinary	399 hours 5 minutes		734 hours 40 minutes.
Extraordinary			669 hours 35 minutes.
Number hours turning in cut, and miscellaneous causes	440 hours 50 minutes	89 hours	476 hours 18 minutes.
Average time to dredge one load	2 hours 55 minutes	1 hour 2 minutes	2 hours 47 minutes.
Average time to dump one load	14 minutes	5.37 minutes	22 minutes.
Average time spent going to and from dump per load	1 hour 59 minutes	20 minutes	27 minutes.

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DISTRIBUTION OF COST AND PERCENTAGE OF TOTAL COST.	Amount.	Per cent.	Amount.	Per cent.	Amount.	Per cent.
Pay roll	$37,534.84	36.41	$22,004.21	35.60	$32,344.92	20.70
Coal	29,791.21	28.90	29,271.62	46.50	[a] 60,216.04	38.60
Water	579.08	.56	120.00	.20	531.06	.34
Supplies:						
Subsistence	10,985.54	10.66	4,630.07	7.35	9,417.52	6.04
Engine room	2,264.04	2.20	1,393.44	2.23	6,051.32	3.88
Miscellaneous	2,141.48	2.08	1,294.02	2.07	8,139.46	5.22
Renewals of or additions to outfit	5,173.84	5.18	827.10	1.32		
Ordinary repairs	5,343.94	5.19	2,519.87	4.00	6,009.76	3.85
Extraordinary repairs					19,898.69	12.75
Laundry and miscellaneous expense, wharfage, etc	1,794.98	1.74	328.25	.53	[b] 10,104.55	6.48
Office expenses	2,898.00	2.81	620.00	10.00	3,231.41	2.07
Surveys	4,565.00	4.43				
Total cost	103,071.95		63,008.58		155,944.73	
Cost per cubic yard with no repairs or additions	$0.0342		$0.0395		$0.0484.	
Cost per cubic yard with ordinary repairs	$0.0361		$0.0411		$0.0507.	
Total cost per cubic yard	$0.0381		$0.0411		$0.0607.	
MISCELLANEOUS.						
Fuel consumed during year	10,496 tons coal		4,487.859 tons coal		54,741.85 barrels oil.	
Average cost of fuel per ton	$2.834 per ton		$6.52 per ton		$1.10 per barrel.	
Number of pounds of fuel consumed per yard of dredged material	8.69 pounds coal		6.5 pounds coal		0.89 gallons oil.	
Water, cost per 1,000 gallons	25 cents		[a] $0.0658		$0.0868.	
Water purchased during year	2,326,235 gallons		1,823,760 gallons		6,168,998 gallons.	
	Remarks.		*Remarks.*		*Remarks.*	
	[a] Total cost, including alterations necessary for efficient work, $397,600. [b] Ambrose channel, 2,246,031, main ship channel, 459,993 cubic yards.		[a] Water cost $10 per month at monthly rate.		[a] Oil fuel used. [b] Includes $5,671.75 for depot expenses, and $3,711.30 for tender. Dredge laid up for general repairs and hauling out July 4 to Aug. 6, 1909. Delays caused by broken hopper door rods, and repairs to pumps. Weather conditions generally fair.	

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TABLE II.—*Partial report of the operations of certain of the pipe-line hydraulic dredges belonging to the Engineer Department, U. S. Army, for the fiscal year ending June 30, 1910.*

Name	*Barnard.*	*Cataract.*	*Congaree.*	*Dalecarlia.*
When built	1904	1905	1908	1907.
Where built	Camden, N. J	Baltimore, M. D		Dalecarlia Reservoir, D. C.
Builder	New York Shipbuilding Co	Ellicott Machine Co	United States with hired labor	Wetherill Bros. Machine Co.
Time to build			8 months	5 months.
Material of hull	Steel	Wood	Wood	White oak and yellow pine.
Contract cost	$230,000	$80,600		
Cost of outfit	(a)	$14,211.48	$20,500	$26,400.
Length	206 feet 2 inches	140 feet 6 inches	110 feet	66 feet.
Beam	38 feet	40 feet 4 inches	32 feet	24 feet.
Depth	14 feet 6 inches	10 feet 7 inches	6 feet	6 feet.
Number, size, and type of propelling engines.	12 x 18 x 30 inch by 18-inch stroke, triple expansion.		2 horizontal hauling engines, double cylinders 7 x 10 inches.	
Number, size, and type of pumping engines.	21 x 32 x 54 inch by 26 inch stroke, triple expansion.	Triple expansion, 12 x 22 x 33 x 20 inches.	1 upright compound 10 x 20 inches, 12-inch stroke. 1 centrifugal pump.	10 x 20 x 10 inch compound.
Number and type of boilers	2 Scotch marine, double end	3 Scotch marine, donkey	2 80-horsepower locomotive boilers.	1 150-horsepower Worthington water-tube boiler.
Length of boilers	18 feet	12 feet 6 inches		10 feet 9½ inches.
Diameter of boilers	11 feet	7 feet		8 feet 9 inches.
WORK PERFORMED.				
District to which dredge belongs	New Orleans, La	Philadelphia, Pa	Charleston, S. C	Washington, D. C.
Location of dredging	Gulfport Harbor, Miss	Black's Farm, transport Prairie and Deep Water Point, Delaware River.	Congaree River and Santee (canal).	Dalecarlia Reservoir, Md. and D. C.
Depth before dredging, average	17.2 feet	18 feet	Congaree River, less than 4 feet; Santee, 3 to 4 feet.	About 3 feet.
Depth after dredging, average	22 feet	32 feet	Congaree River, 4 feet; Santee, 8 feet.	About 12 feet.
Character of material dredged	Mud	Sand, stones, clay, gravel, and mud.	Sand and soft mud	Hard clay and partially disintegrated rock.
Average number of cuts per hour			5	About 4.
Width of cuts	10 feet		80 feet	80 feet.
Total length of cuts				
Cutting speed per minute:				
To port			13 feet	
To starboard			13 feet	
Rate of advance per hour	1,320 feet		15 feet	
Amount dredged during year	3,005,270 cubic yards	1,194,480 cubic yards	106,132 cubic yards	(c)
Average amount dredged:				
Per hour	1,319 cubic yards	378 cubic yards	300 cubic yards	60 cubic yards.
Per day	12,680 cubic yards	7,068 cubic yards	3,000 cubic yards	376 cubic yards.

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PLANT.				
Discharge pipe in use	400 to 600 feet	2,500 feet	500 feet	800 feet.
Diameter of discharge pipe	36 inches	20 inches	12 inches	12 inches.
Number of pontoons in use per 100 feet of pipe line.	4	2.5	3	5.
Material of pontoon	Steel	Wood	Pine	Virginia pine.
Length of pontoons	23 feet	20 feet	22 and 20 feet	16 feet.
Beam of pontoons	8 feet 6 inches	16 feet	17 and 7 feet	6 feet.
Depth of pontoons	3 feet 10 inches	2 feet 7 inches	3.5 feet	2 feet.
Draft of pontoon with discharge pipe empty.	14 inches	12 feet	18 inches	
Draft of pontoon with discharge pipe full.	30 inches	14.5 feet	24 inches	
Revolutions per minute of propelling engines.	170	No propelling engines		No propelling engines.
Revolutions per minute of pumping engines.	118	180	250	265.
Revolutions per minute of cutter head		20	25	18.
Average boiler pressure (gauge)	150 pounds	180 pounds	100 pounds	100 pounds.
Kind of coal used	Bituminous	Semibituminous	Wood used	New River bituminous.
Average vacuum in suction pipe	9 inches	20 inches		16 inches.
Average gauge pressure in discharge pipe	5 pounds	24 pounds		15 pounds.
Draft of dredge:				
Forward	9 feet 6 inches	6 feet 2 inches		3 feet.
Aft	10 feet	6 feet 6 inches	2.5 feet	3 feet.
Displacement of dredge	754 tons	886 tons	275 tons	
Number of crew	42	35	13	5.
TOWBOATS.				
Name of tug attached to dredge	C. Donovan	None attached		None used.
Number of crew	9			
Displacement in tons	134 tons			
Draft:				
Forward	9 feet			
Aft	10 feet 6 inches			
LAUNCHES.				
Name		Dorothy	Black Devil	None used.
Length		22 feet 6 inches	23 feet 6 inches	
Beam		6 feet 8 inches	6 feet 3 inches	
Depth		36 inches	23 inches	
Draft		36 inches	6 inches	
Displacement in tons		2 tons	1⅞ tons	
BARGES.				
Number of barges in use	1	1		None.
Usage	Coal	Coal scow		
Displacement, light	120 tons	103.5 tons		
Capacity all barges	200 tons	80 to 90 tons		

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TABLE II.—*Partial report of the operations of certain of the pipe-line hydraulic dredges belonging to the Engineer Department, U. S. Army, for the fiscal year ending June 30, 1910*—Continued.

Name	*Barnard.*	*Cataract.*	*Congaree.*	*Dalecarlia.*
DISTRIBUTION OF EFFECTIVE WORKING TIME.				
Pumping	2,278 hours 27 minutes	3,160 hours		
Handling pipe line		86 hours		
Handling swinging wires		33 hours		
Going to and from wharf and anchorage	55 hours 45 minutes			
Placing dredge	216 hours 48 minutes	502 hours		
Waiting for vessels to pass	10 hours 41 minutes			
DISTRIBUTION OF TIME LOST.				
Changing location of plant	19 hours 30 minutes	148 hours		
Bad weather	231 hours 35 minutes	278 hours		
Washing boilers and ordinary repairs	725 hours 57 minutes	423 hours		
Extraordinary repairs	321 hours	825 hours		
Other causes	272 hours 17 minutes	944 hours		
Sundays and holidays	1,004 hours	1,449 hours		
COST OF WORK.				
Dredge.				
Pay rolls	$27,967.25	$17,135.89	$3,215.45	$4,999.93
Coal for boilers	23,900.05	6,313.30		2,243.27
Coal for galley	101.68			
Water		4.00		
Supplies, subsistence	8,707.41	5,490.88	647.25	
Supplies, engine room	5,083.90	1,697.37		
Other supplies	2,922.39	2,690.41	1,803.29	
Renewals or addition to outfit	7,912.74	5,744.86		418.35
Ordinary repairs	3,424.42	5,582.77	113.82	
Laundry, ice, miscellaneous expenses	808.83	153.55	398.56	
Total	$80,828.67	$44,813.03	$6,178.37	$7,661.55

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Towboats and launches.				
Pay rolls	5,964.12			
Coal for boiler	1,564.18			
Coal for galley	30.32			
Supplies, subsistence	1,426.08			
Supplies, engine room	358.80			
Launch supplies		91.65	Included in above	
Renewals of or additions to outfit	542.76			
Ordinary repairs	319.40			
Laundry, ice, miscellaneous expenses, etc.	56.52			
Total	10,262.18	91.65		
Barges.				
Ordinary repairs to barges	101.39			
Total field cost	$91,192.24		$6,178.00	
Total field cost per cubic yard	$0.0303		$0.067	
Office expenses, superintendence, surveys, etc.	13,216.28	8,911.48		
Extraordinary repairs to dredge	3,197.45	4,706.49		
Extraordinary repairs to towboats and launches.	286.50			
Extraordinary repairs to barges	[b] 2,276.16			
	18,976.39	13,617.97		
Total	110,168.63	58,522.65		7,631.55
Gross cost per cubic yard	$0.0367	$0.049		
Coal consumed	7,031.93 tons	2,177 tons		
Cost of coal	$3.64 per ton	$2.90 per ton		
Water used		16,000 gallons		
Cost of water		25 cents per 1,000 gallons		
Remarks	[a] Tug cost $29,000. The cost of other equipment not known. [b] Floating and repairing barge after a storm.	[a] Dec. 5 to 12, 1909, helped to float the transport Prairie, pumping 37,000 cubic yards of material at cost of $954.38. NOTE.—Double shift (24 hours per day) was worked for 289 days; single shift (12 hours per day) for 76 days; total, 7,848 hours.		[a] Average number of cubic yards dredged per month, 12,700.

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TABLE II.—*Partial report of the operations of certain of the pipe-line hydraulic dredges belonging to the Engineer Department, U. S. Army, for the fiscal year ending June 30, 1910*—Continued.

Name	*Etna.*	*Florida.*	*Geyser.*	*Hecla.*
When built	1908–9	1904–5	1893	1900–1901.
Where built	Des Moines Rapids Canal	Jacksonville, Fla	Des Moines Rapids Canal	Fountain City, Wis.
Builder	United States	Merrill-Stevens Co	United States	United States.
Time to build	About 9 months	8 months	About 6 months	About 1 year.
Material of hull	Wood	Steel	Wood	Fir and oak.
Contract cost	$29,733 a	$80,000	$4,704 a	$27,084. a
Cost of outfit		$10,000	(a)	
Length	130 feet	175 feet	120 feet	120 feet.
Beam	28 feet	29 feet 9 inches	20 feet	26 feet.
Depth	5 feet	8 feet	4 feet	5 feet.
Number, size, and type of propelling engines.		Two 15.5 inches x 5 feet 6 inches, horizontal, Marshall valve gear.		
Number, size, and type of pumping engines.	Ball compound engine, high-pressure cylinder 12 x 16 inch stroke; low pressure 23 x 16 inch.	12 x 20 x 12 inch, Westinghouse automatic.	10-inch centrifugal, Jos. Edwards.	Jos. Edwards centrifugal sand pump, engines 14 and 24 inch diameter.
Number and type of boilers	3 boilers with 5-8-inch flues each.	2 Clyde	1 horizontal, with ten 6-inch flues.	2, with fifty-eight 3.5-inch tubes.
Length of boilers	20 feet	11 feet 3 inches	26 feet	15 feet 6 inches.
Diameter of boilers	40 inches	8 feet	42 inches	84 inches.
WORK PERFORMED.				
District to which dredge belongs		Jacksonville, Fla	Rock Island, Ill	Rock Island, Ill.
Location of dredging	Above Keithsburg, Ill	Manatee River, Crystal River, Caloosahatchee River.	Vicinity of Anderson Island in Rock River Pool.	Des Moines Rapids Canal.
Depth before dredging, average	1 foot at low water	3 to 8 feet	1.3 feet at low water	
Depth after dredging, average	8 feet at low water	6 to 13 feet	8 feet at low water	5.5 feet.
Character of material dredged	Sand and gravel	Mud, sand, shell, and clay	Sand and gravel	Mud and sand.
Average number of cuts per hour	24	No record	0.66	10.
Width of cuts	100 feet	60 feet	76 feet	100 feet.
Total length of cuts	3,675 feet	34,482 feet	2,969 feet	5,632 feet.
Cutting speed per minute:				
To port	80 feet		1.75 feet	33 feet.
To starboard	do		do	Do.
Rate of advance per hour	10½ feet	15.45 feet	6.6 feet	17.5 feet.
Amount dredged during year	120,468 cubic yards	261,146 cubic yards	(b)	41,030 b cubic yards during month.
Average amount dredged:				
Per hour	339 cubic yards	117.05 cubic yards	126 cubic yards	128.4 cubic yards.
Per day	4,154 cubic yards	1,070.27 cubic yards	2,061 cubic yards	1,712 cubic yards.

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PLANT.				
Discharge pipe in use	750 feet	80 feet	300 feet	365 feet.
Diameter of discharge pipe	18 inches	12 inches	12 inches	18 inches.
Number of pontoons in use per 100 feet of pipe line.	2	None	2	2.
Material of pontoon	Wood, concrete deck		Fir lumber	Wood.
Length of pontoons	35 feet		45 feet	38 feet.
Beam of pontoons	14 feet		16 feet	14 feet.
Depth of pontoons	3 feet		2 feet 5 inches	3 feet.
Draft of pontoon with discharge pipe empty.	1 foot		10 inches	9 inches.
Draft of pontoon with discharge pipe full.	1.2 feet		10 inches	12 inches.
Revolutions per minute of propelling engines.		17		
Revolutions per minute of pumping engines.	200	175	130	185.
Revolutions per minute of cutter head		None, suction head with fixed teeth.		
Average boiler pressure (gauge)	140 pounds	115 pounds	120 pounds	125 pounds.
Kind of coal used	Mine run, bituminous	Pine-wood fuel	Soft Illinois coal	Illinois mine run.
Average vacuum in suction pipe	17 inches	14 inches	18 inches	16 to 18 inches.
Average gauge pressure in discharge pipe.	14 pounds		10 pounds	8 to 10 pounds.
Draft of dredge:				
Forward	2.6 feet	4 feet 6 inches	2 feet 1 inch	2.5 feet.
Aft	2.6 feet	4 feet 9 inches	2 feet 1 inch	2.5 feet.
Displacement of dredge	266 tons	175 tons	100 tons	183 tons.
Number of crew	16	21	16	15 (2 crews) 10 hours each.
TOWBOATS.				
Name of tug attached to dredge	Henry Bosse	None		Grace.
Number of crew	8			5.
Displacement in tons	118 tons			8 tons.
Draft:				
Forward	3 feet			2.5 feet.
Aft	3 feet			2.5 feet.
LAUNCHES.				
Name	Holly	Freak		None.
Length	26 feet	28 feet		
Beam	5 feet 4 inches	8 feet		
Depth	24 inches	3 feet		
Draft	1 foot	1 foot		
Displacement in tons		3 tons		
BARGES.				
Number of barges in use	4	Hired temporarily	2	2.
Usage	Coal (1 barge per pipe)		Coal	Coal.
Displacement, light	225 tons		3.8 tons each	138 tons.
Capacity all barges	500 tons		105 each	300 tons.

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TABLE II.—*Partial report of the operations of certain of the pipe-line hydraulic dredges belonging to the Engineer Department, U. S. Army, for the fiscal year ending June 30, 1910*—Continued.

Name	*Etna.*	*Florida.*	*Geyser.*	*Hecla.*
DISTRIBUTION OF EFFECTIVE WORKING TIME.				
Pumping	355 hours	2,231 hours	446 hours	320 hours 50 minutes.
Handling pipe line	155 hours	14 hours	24 hours	
Placing dredge	70 hours	4 hours	7 hours	
Waiting for vessels to pass	10 hours	161 hours snagging		
DISTRIBUTION OF TIME LOST.				
Changing location of plant	70 hours	124 hours		24.35 hours.
Bad weather	35 hours	22 hours		
Washing boilers and ordinary repairs	24 hours	45 hours	23 hours	51 hours.
Extraordinary repairs		107 hours		
Taking fuel and water		20 hours		
Other causes	106 hours	326 hours		93.35 hours.
Sundays and holidays	6 days	596 hours	120 hours	128 hours.
COST OF WORK.				
Dredge.				
Pay rolls	$1,206.84	$12,664.22	$927.84	$795.40
Coal for boilers	1,141.74	[c] 6,912.08	270.00	414.46
Coal for galley		[a]		4.46
Water		39.53		
Supplies, subsistence	206.61	4,301.86	117.90	160.54
Supplies, engine room	83.45	418.81	11.50	37.00
Other supplies	23.32	1,287.86		
Renewals or addition to outfit	131.13	1,301.19	189.36	
Ordinary repairs		3,261.80	154.26	15.00
Laundry, ice, miscellaneous expenses	43.40	350.52	2.00	
Total	$2,836.50	$30,537.47	$1,672.86	$1,426.86
Towboats and launches.				
Pay rolls	207.50			255.00
Coal for boiler	92.25			64.77
Coal for galley				2.23
Supplies, subsistence	42.60			56.00
Supplies, engine room	5.40			15.00

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Launch supplies	19.20	996.76		
Laundry, ice, miscellaneous expenses, etc.	7.88			
Total	374.83	996.76		392.90
Total field cost	3,211.33	[b] 31,534.23	$1,672.86	$1,819.76
Total field cost per cubic yard	$0.0266	$0.113	$0.03	$0.044
Office expenses, superintendence, surveys, etc.	274.99	2,463.74		150.00
Total	3,486.32	33,997.97		1,920.20
Gross cost per cubic yard	$0.029	$0.1301		$0.047
Coal consumed		Wood fuel	150 tons	
Cost of coal			$1.80 per ton	
Remarks	[a] Including outfit. The Etna was in commission during the last fiscal year (with double crew working 20 hours a day), 143 days (excluding Sundays and holidays), during which time she worked at 17 different localities, at which the material was mud, sand, or gravel; made 26,431 linear feet of cuts, covered a total area of 2,629,750 square feet, and removed 342,099 cubic yards of material.	[a] Total for wood fuel used. [b] Less $2,027, cost of snagging, $29,506.30.	[a] The Geyser cost $4,704, including outfit and 8 pontons. [b] Above report of work is for the month of May, 1910. The pay rolls are for the month of August, 1910. The Geyser worked during the year, with double crew, in the Illinois and Mississippi Canal and Rock River Pool, 173 (10 hours) days, during which time she removed from various localities 160,798 cubic yards of sand, mud, and gravel. She covered an area of 891,355 square feet, made cuts of a total length of 11,383 feet and of an average width of 75 feet.	[a] Includes contract cost and cost of outfit. [b] The work of August, 1910, is given above. During the previous fiscal year she was moved about so much that no fair description of her normal work could be given. The statement given is typical. The Hecla was in commission during the past fiscal year (with double crew about one-half of the time), 131 days, during which time she worked at 15 different localities, at which the material was sand and gravel; made 4,184 linear feet of cuts, covered a total area of 1,104,970 square feet, and removed 168,937 cubic yards of material.

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TABLE II.—*Partial report of the operations of certain of the pipe-line hydraulic dredges belonging to the Engineer Department, U. S. Army, for the fiscal year ending June 30, 1910*—Continued.

Name	*Capt. C. W. Howell.*	*Chas. Humphreys.*	*Indiana.*	*Jacksonville.*
When built	1904	1907–8		1903–4.
Where built	Texas City, Tex	Mobile, Ala		Jacksonville, Fla.
Builder	United States	United States		United States.
Time to build	6½ months	About 1 year		About 1 year.
Material of hull	Wood	Wood		Wood.
Contract cost	$40,000[a]	$46,560.97[a]		$125,000.
Cost of outfit	(a)	(a)		
Length	125 feet	100 feet		140 feet.
Beam	26 feet	32 feet		40 feet.
Depth	5 feet	8 feet 9 inches		10 feet.
Number, size, and type of propelling engines.	One 12 x 48, 2-cylinder			
Number, size, and type of pumping engines.	One 12 x 22 x 18 inch direct connected to pump.	1 vertical marine compound engine, about 150 horsepower, direct connected to pump.	12 x 22 x 14 inch horizontal compound; develops 250 horsepower.	1 triple expansion marine engine, 42 x 27.5 x 17 inches and 20-inch stroke.
Number and type of boilers	2 Scotch marine boilers	2 western river steamboat type, 5 flues (11-inch).	Worthington, water-tube marine.	4 Babcock & Wilcox Co. water-tube boilers.
Length of boilers	10 feet	28 feet	10 feet 1 inch	14 feet long, 11 feet high.
Diameter of boilers	7 feet 6 inches	47 inches	42 inches	7.5 and 8 feet wide (2 each).
WORK PERFORMED.				
District to which dredge belongs	Galveston, Tex	Mobile, Ala	Cincinnati, Ohio	Jacksonville, Fla.
Location of dredging	West Galveston Bay and adjacent streams.	Black Warrior and Tombigbee rivers, Ala.	Sisters Islands, Ohio River, 896 miles below Pittsburg.	Cape Fear River, N. C., between Wilmington and Reeves Point.
Depth before dredging, average	3 feet		3.9 feet	22 feet.
Depth after dredging, average	7 feet		8 feet	25 feet.
Character of material dredged	Sand, clay, mud, and silt	Sand and gravel	Sand and gravel	Sand, silt, mud, and clay.
Average number of cuts per hour	12		3.4	3.
Width of cuts	60 feet		100 feet	100 feet.
Total length of cuts			3,006 feet	8 feet each.
Cutting speed per minute:				
To port	20 feet		5.6 feet	10 feet.
To starboard	....do		....do	Do.
Rate of advance per hour	50 feet		20.4 feet	24 feet.
Amount dredged during year	378,660 cubic yards	67,864.3 cubic yards	45,938 cubic yards	1,014,003 cubic yards.
Average amount dredged:				
Per hour	157.44 cubic yards		308.3 cubic yards	509 cubic yards.
Per day	2,295 cubic yards		1,837.5 cubic yards	3,255 cubic yards.

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PLANT.				
Discharge pipe in use	250 feet		504 feet	700 feet.
Diameter of discharge pipe	12 inches		17 inches	32 inches.
Number of pontoons in use per 100 feet of pipe line.	4		1.67	6.
Material of pontoon	Wood		Steel	Wood.
Length of pontoons	23.9 feet		40 feet	20 feet.
Beam of pontoons	8 feet		12 feet	8 feet.
Depth of pontoons	2 feet 3 inches		3 feet 2 inches	3.5 feet.
Draft of pontoon with discharge pipe empty.	0.7 feet		11 inches	20 inches.
Draft of pontoon with discharge pipe full.	0.8 feet		13.5 inches	32 inches.
Revolutions per minute of propelling engines.	11			
Revolutions per minute of pumping engines.	180		240	160.
Revolutions per minute of cutter head	30		15	
Average boiler pressure (gauge)	120 pounds		150 pounds	175 pounds.
Kind of coal used	Crude oil fuel		Bituminous, mine-run	Bituminous.
Average vacuum in suction pipe	12 inches		18 inches	15 inches.
Average gauge pressure in discharge pipe.	7 pounds		10 pounds	15 pounds.
Draft of dredge:				
Forward	3 feet 7.5 inches		3 feet 8 inches	6 feet.
Aft	3 feet 8 inches		3 feet 8 inches	7 feet.
Displacement of dredge	300 tons		417.5 tons	900 tons.
Number of crew	28		18	31.
TOWBOATS.				
Name of tug attached to dredge			Nellie Willett	Coquet.
Number of crew			9	5.
Displacement in tons			98 tons	120 tons.
Draft:				
Forward			3 feet 6 inches	5 feet 3 inches.
Aft			3 feet 9 inches	7 feet 6 inches.
LAUNCHES.				
Name	(a) Bastrop; (b) Snapshot			
Length	(a) 46 feet 6 inches; (b) 18 feet			
Beam	(a) 11 feet 3 inches; (b) 5 feet 9 inches.			
Depth	(a) 5 feet; (b) 2 feet 6 inches			
Draft	(a) 3 feet 6 inches; (b) 1 foot 8 inches.			
Displacement in tons	(a) 16 tons; (b) 1 ton			
BARGES.				
Number of barges in use	2		2	
Usage	Water and oil		Fuel and supplies	Coal.
Displacement, light	52.7 tons		114 tons	10 tons.
Capacity all barges	100 tons		320 tons	100 tons.

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TABLE II.—*Partial report of the operations of certain of the pipe-line hydraulic dredges belonging to the Engineer Department, U. S. Army, for the fiscal year ending June 30, 1910*—Continued.

Name	*Capt. C. W. Howell.*	*Chas. Humphreys.*	*Indiana.*	*Jacksonville.*
DISTRIBUTION OF EFFECTIVE WORKING TIME.				
Pumping	2,404 hours 55 minutes	833 hours 30 minutes	149 hours	2,120 hours 47 minutes.
Handling pipe line	16 hours 20 minutes		14.6 hours	224 hours 6 minutes.
Handling swinging wires	156 hours 20 minutes	8 hours 30 minutes	25.1 hours	42 hours 58 minutes.
Placing dredge		68 hours	3.1 hours	10 hours 29 minutes.
Waiting for vessels to pass				1 hour 38 minutes.
DISTRIBUTION OF TIME LOST.				
Changing location of plant	254 hours 35 minutes	238 hours		212 hours 52 minutes.
Bad weather	29 hours 25 minutes		0.6 hours	45 hours 52 minutes.
Washing boilers and ordinary repairs	241 hours 10 minutes	91 hours		322 hours 51 minutes.
Extraordinary repairs	485 hours 40 minutes	229 hours	10.8 hours	96 hours 29 minutes.
Taking fuel and water	3 hours			1 hour 57 minutes.
Other causes	1,712 hours 55 minutes	347 hours	4.8 hours	469 hours 47 minutes.
Sundays and holidays	1,008 hours	362 hours	40 hours	65 hours.
Dredge laid up	2,448 hours.			
COST OF WORK.				
Dredge.				
Pay rolls	$13,020.52	$5,554.28	$863.00	$17,901.86
Coal for boilers	[b] 7,163.62	965.06	204.00	13,774.01
Coal for galley	140.88		3.00	
Water	29.17			
Supplies, subsistence	3,168.78	1,121.58	200.34	4,336.06
Supplies, engine room	537.92	236.59	16.03	1,349.46
Other supplies	1,236.31	87.32	2.95	378.48
Renewals or additions to outfit	714.95		42.90	3,706.23
Ordinary repairs	840.94	184.34	24.48	5,797.11
Laundry, ice, miscellaneous expenses	[c] 3,757.05	286.45	7.55	[a] 15,673.45
Total	$30,609.64	$8,435.62	$1,424.25	$62,916.66
Towboats and launches.				
Pay rolls				3,452.33
Coal for boiler				1,051.54
Supplies, subsistence				1,060.86
Supplies, engine room				145.35
Other supplies			1,426.10	57.35
Renewals of or additions to outfit				48.78

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Ordinary repairs				1,611.10	
Laundry, ice, miscellaneous expenses, etc.				[b] 449.60	
Total	3,102.63			7,896.91	[c] 4,655.90
Barges.					
Ordinary repairs to barges					125.06
Total field cost	33,712.27	8,120.50	2,850.35		67,697.63
Total field cost per cubic yard	$0.0785		$0.062	$0.067	
Office expenses, superintendence, surveys, etc.	1,291.51		300.00	10,375.00	
Extraordinary repairs to dredge	4,733.58				
Extraordinary repairs to towboats and launches	325.00				
Extraordinary repairs to barges	[d] 1,421.51				
	7,771.60		300.00		10,375.00
Total	[c] 41,483.87		3,150.35		78,072.63
Gross cost per cubic yard	$0.099	$0.1196	$0.0686		$0.077
Coal consumed	Oil fuel used		103½ tons	4,011.23 tons.	
Cost of coal	do		$2 per ton	$3.696 per ton.	
Remarks	[a] Includes cost of outfit. [b] Oil fuel used. [c] Includes $3,358.13 for Fort Point depot expenses. [d] Expenses incidental to laying up dredge and alterations. [e] Deducting for work done for private parties, $3,997.71; total for private parties, $37,486.16.	[a] Contract cost, plus cost of outfit. [b] Less $315.12, cost furnishing steam for pumping out cofferdam around retaining crib at Lock No. 4.	Above report covers operations of this dredge for one month.	[a] Includes $14,965 for rent of dredge. [b] Includes $375 for rent of boat. [c] Represents part charged to operating Jacksonville, as the towboat did not devote all of her time to the Jacksonville.	

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TABLE II.—*Partial report of the operations of certain of the pipe-line hydraulic dredges belonging to the Engineer Department, U. S. Army, for the fiscal year ending June 30, 1910*—Continued.

Name	*Col. A. M. Miller.*	*Morgan.*	*Oregon.*	*Pascagoula.*
When built	1906.	1907–8.	1908.	1909.
Where built	Orange, Tex.	Baltimore, Md.	Portland, Oreg.	Baltimore, Md.
Builder	Bowers Southern Dredging Co.	Ellicott Machine Co.	Portland Iron Works.	Ellicott Machine Co.
Time to build	7 months.	About 7 months.	8 months.	8 months.
Material of hull	Long-leaf pine, copper sheathed.	Steel.	Wood.	Steel.
Contract cost	$102,000.	$119,676.21.	$79,340.	$143,600.
Cost of outfit	$10,952.45.	$31,500.13.	$81,274.	$52,210.39.
Length	138 feet 6 inches.	134 feet 5 inches.	120 feet.	150 feet.
Beam	37 feet.	38 feet.	36 feet.	40 feet.
Depth	13 feet.	8 feet.	11 feet.	10 feet 6 inches.
Number, size, and type of propelling engines.		Double horizontal, 12 x 14 inches; single-screw propulsion.		
Number, size, and type of pumping engines.	14 x 22.5 x 36 inches, 18-inch stroke, triple expansion.	12 x 20 x 32 cylinders, 20-inch stroke, triple expansion.	1 Ball engine, 18 and 28 inch diameter, 18-inch stroke.	Triple expansion, 12 x 20 x 33 inch by 20-inch stroke.
Number and type of boilers	2 Heine, 80-horsepower, 180 pounds pressure.	2 Scotch marine boilers.	2 Heine pipe boilers.	2 Scotch marine boilers.
Length of boilers		11 feet.	18 feet.	11 feet 6 inches.
Diameter of boilers		....do.	14 feet.	11 feet.
WORK PERFORMED.				
District to which dredge belongs	Galveston, Tex.	Savannah, Ga.	Seattle, Wash.	Mobile, Ala.
Location of dredging	Galveston Channel, Tex.	Savannah Harbor, Ga.	Grays Harbor, Wash.	Pascagoula River, Miss.
Depth before dredging, average	27 feet.	2 to 21 feet.	10 feet.	13.2 feet.
Depth after dredging, average	35 feet.	20 to 30 feet.	20 feet.	20.2 feet.
Character of material dredged	Silt, mud, sand, and hard red clay.	Sand, mud, ballast rock, shells, and clay.	Sand, clay, gravel, forest trash, and seaweed.	Mud, clay, and sand.
Average number of cuts per hour	6.	3.	4.	3.
Width of cuts	150 feet.	200 feet.	125 feet.	2.9 feet.
Total length of cuts	3.5 feet per cut (30,450 feet channel).	12,920 feet.	23,000 feet.	200 feet.
Cutting speed per minute:				
To port		18.45 feet.	21 feet.	100 feet.
To starboard		15.6 feet.	20 feet.	30 feet.
Rate of advance per hour	6.5 feet.	3.7 feet.	40 feet.	8.7 feet.
Amount dredged during year	1,309,955 cubic yards.	962,684 cubic yards.	418,742 cubic yards.	1,233,653 cubic yards.
Average amount dredged:				
Per hour	279.88 cubic yards.	281.07 cubic yards.	725 cubic yards.	340.7 cubic yards.
Per day	5,019 cubic yards.	4,167.4 cubic yards.	6,000 cubic yards.	6,047 cubic yards.

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PLANT.				
Discharge pipe in use	1,600 feet	600 feet	650 feet	1,100 feet.
Diameter of discharge pipe	20 inches	20 inches	18 inches	20 inches.
Number of pontoons in use per 100 feet of pipe line.	6		3½	5.
Material of pontoon	Wood	Steel	Wood	Wood.
Length of pontoons	24 feet	24 feet	20 feet	25 feet 4 inches.
Beam of pontoons	5 feet	17 feet 3 inches	10 feet	4 feet 8 inches.
Depth of pontoons	5 feet	24 inches	2 feet	5 feet.
Draft of pontoon with discharge pipe empty.	2 feet	18 inches	11 inches	24 inches.
Draft of pontoon with discharge pipe full.	2 feet 4 inches	24 inches	15 to 16 inches	33 inches.
Revolutions per minute of propelling engines.		200		
Revolutions per minute of pumping engines.	175	200	175	175.
Revolutions per minute of cutter head	10	12	7	13.
Average boiler pressure (gauge)	180 pounds	175 pounds	135 pounds	175 pounds.
Kind of coal used	Crude oil used	New River	Slab wood fuel	Bituminous.
Average vacuum in suction pipe	15 inches	18 inches	19 inches	15 inches.
Average gauge pressure in discharge pipe.	27 pounds	26 pounds	20 pounds	20.5 pounds.
Draft of dredge:				
Forward	8 feet	4 feet 6 inches	5 feet	5 feet 3 inches.
Aft	7 feet	5 feet	5 feet	5 feet 3 inches.
Displacement of dredge	710 tons	667 tons	645 tons	794 tons.
Number of crew	49	36	21	42.
TOWBOATS.				
Name of tug attached to dredge	Captain Talfor	Gibbon	G. H. Mendell	Chickasaw.
Number of crew	6	5	5	9.
Displacement in tons	43 tons	59 tons		156 tons.
Draft:				
Forward	4 feet 6 inches	5 feet 6 inches		7 feet.
Aft	7 feet	9 feet		8 feet.
LAUNCHES.				
Name	"C. B. C."		Walter	Biloxi.
Length	20 feet 4 inches		45 feet	40 feet.
Beam	6 feet		11 feet 6 inches	11 feet.
Depth	3 feet		3 feet 6 inches	4 feet 9 inches.
Draft	14 inches		4 feet 6 inches	3 feet 9 inches.
Displacement in tons			12.5 tons	9.7 tons.
BARGES.				
Number of barges in use	1	2	1 to 3	2.
Usage	Oil and water	Coal and water; derrick	Fuel, water, and repair scow	Coal and water.
Displacement, light	60 tons	72; 44 tons	120 tons	121 tons.
Capacity all barges	285 tons	225; 86 tons	300 tons	228 tons.

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TABLE II.—*Partial report of the operations of certain of the pipe-line hydraulic dredges belonging to the Engineer Department, U. S. Army, for the fiscal year ending June 30, 1910*—Continued.

Name	*Col. A. M. Miller.*	*Morgan.*	*Oregon.*	*Pascagoula.*
DISTRIBUTION OF EFFECTIVE WORKING TIME.				
Pumping	4,080 hours 20 minutes	3,425 hours	575 hours	3,620 hours 48 minutes.
Handling pipe line	238 hours 40 minutes	1,105 hours	15 hours	178 hours 45 minutes.
Handling swinging wires	160 hours 15 minutes		35 hours	136 hours 45 minutes.
Going to and from wharf and anchorage			20 hours	37 hours.
Placing dredge			24 hours	8 hours 57 minutes.
Waiting for vessels to pass		8 hours 25 minutes	10 hours	1 hour 40 minutes.
DISTRIBUTION OF TIME LOST.				
Changing location of plant	119 hours	185 hours	100 hours	143 hours 50 minutes.
Bad weather	245 hours 15 minutes	120 hours	520 hours	135 hours 4 minutes.
Washing boilers and ordinary repairs	491 hours 20 minutes	888 hours 46 minutes		1,019 hours 18 minutes.
Extraordinary repairs	1,186 hours 50 minutes	792 hours	181 hours	328 hours 30 minutes.
Other causes	390 hours 20 minutes	288 hours 50 minutes	250 hours	101 hours 23 minutes.
Sundays and holidays	1,248 hours	1,416 hours	340 hours	1,080 hours.
COST OF WORK.				
Dredge.				
Pay rolls	$24,960.53	$19,842.90	$10,402.34	$21,045.88
Coal for boilers	[a] 28,685.43	10,763.50	4,902.47	10,698.92
Coal for galley	257.26			47.25
Water	274.71		70.00	255.88
Supplies, subsistence	7,780.96	5,484.16	2,600.00	5,395.07
Supplies, engine room	2,659.57	4,726.02	300.00	2,706.89
Other supplies	6,536.20	4,709.52		4,593.27
Renewals or addition to outfit	4,805.24	2,215.98	2,406.80	4,775.64
Ordinary repairs	2,837.03	3,452.40	100.00	1,254.40
Laundry, ice, miscellaneous expenses	[b] 3,688.33	782.10	1,600.00	720.83
Total	$82,485.25	$51,976.58	$22,381.61	$51,494.03

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Towboats and launches.								
Pay rolls			3,525.00				2,507.50	
Coal for boiler			1,613.93				570.50	
Coal for galley							3.50	
Supplies, subsistence			939.69				156.53	
Supplies, engine room			227.83				397.71	
Launch supplies		(c)	48.48		[a] 2,492.19		1,195.72	
Other supplies			22.50				128.09	
Ordinary repairs			621.18					
Laundry, ice, miscellaneous expenses, etc.			67.50				35.50	
Total		6,298.22		7,066.11				4,995.05
Barges.								
Ordinary repairs to barges								30.80
Total field cost		88,783.47		59,042.69		24,873.80		56,519.88
Total field cost per cubic yard	$0.0678		$0.061331					$0.0458.
Office expenses, superintendence, surveys, etc.		4,782.19		6,278.81		2,521.85		8,284.97
Extraordinary repairs to dredge		12,851.91		8,429.17				1,197.24
Extraordinary repairs to towboats and launches.				92.00				
Extraordinary repairs to barges						2,500.00		
				14,799.98		29,895.65		9,482.21
Total				73,842.67		29,895.65		66,002.09
Gross cost per cubic yard		$0.0821		0.076705		$0.07139		$0.0535
Coal consumed	26,046.82 barrels oil		3,266.5 tons				3,234.33 tons.	
Cost of coal	$1.10 per barrel		$3.787 per ton				$3.50 per ton.	
Water used							1,023,520 gallons.	
Cost of water							25 cents per 1,000 gallons.	
Remarks	[a] Oil fuel used for boilers. [b] Includes $3,538.81 for Fort Point depot expenses. [c] No itemized record kept for year 1909–10				[a] Hire of launch and scow			

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TABLE II.—*Partial report of the operations of certain of the pipe-line hydraulic dredges belonging to the Engineer Department, U. S. Army, for the fiscal year ending June 30, 1910*—Continued.

Name	*Pelee.*	*Pettus.*	*Port Arthur.*	*Suwanee.*
When built	1908–9.	1908–9.	1900.	1888–89.
Where built	South Stillwater, Minn.	Mobile, Ala.	Port Arthur, Tex.	Branford, Fla.
Builder		Gulfport Creosoting Co.	Port Arthur Canal and Dock Co.	S. W. Skinner.
Time to build	9 months.			4 months.
Material of hull	Wood.	Creosoted pine.	Yellow pine.	Wood.
Contract cost	$36,172.	$62,352.25.	$12,000.	$10,000.
Cost of outfit	Included in above.	Included in above.	Included in above.	$2,000.
Length	119 feet.	135 feet.	60 feet.	114 feet.
Beam	30 feet.	35 feet.	28 feet.	26 feet.
Depth	5 feet.	6 feet 6 inches.	6 feet.	5 feet.
Number, size, and type of propelling engines.		Two 15 inches in diameter by 6-foot stroke.		2 horizontal, link motion, 10 x 32 inches.
Number, size, and type of pumping engines.	15-inch Morris pump.	One 13 x 20 x 16 inch stroke, /- cross compound.	Bucyrus, 2-cylinder, 9.5 and 16 x 8 inches; vertical engine with Worthington condenser.	1 horizontal, belt drive, 14 x 18 inches.
Number and type of boilers	2 Hawkes boilers.	3 Western River type, with 5 flues each.	2 Scotch marine.	1 Clyde boiler.
Length of boilers	16 feet.	30 feet.	11 feet.	11 feet 3 inches.
Diameter of boilers	60 inches.	42 inches.	66 inches.	8 feet.
WORK PERFORMED.				
District to which dredge belongs	Rock Island, Ill.	Montgomery, Ala.	Dallas, Texas.	Jacksonville, Fla.
Location of dredging	Mississippi River, near Alma, Wis.	Alabama River, Ala.	Port Arthur Ship Canal and Johnsons Bayou, La.	Anclote River, Little Sarasota Bay.
Depth before dredging, average	3 feet.	½ foot.	Canal, 23.5 feet; bayou, 2.5 feet.	1.5 to 2.5 feet.
Depth after dredging, average	9 feet.	6 feet.	Canal, 27 feet; bayou, 7 feet.	4.9 to 5.5 feet.
Character of material dredged	Sand.	Sand and gravel.	Silt and soft blue clay and sand.	Mud, sand, shell, rock, and clay.
Average number of cuts per hour			10.	
Width of cuts	100 feet.	100 feet.	2 feet.	50 feet.
Total length of cuts	2,100 feet.	15,000 feet.	100 feet.	15,335 feet.
Cutting speed per minute:				
To port			30 feet.	
To starboard			do.	
Rate of advance per hour	15 feet.	7 feet.	3.5 feet.	10.45 feet.
Amount dredged during year	46,058 cubic yards during month.	305,173 cubic yards.	240,733.9 cubic yards.	69,221.6 cubic yards.
Average amount dredged:				
Per hour	317 cubic yards.	143 cubic yards.	56.1 cubic yards.	47.18 cubic yards.
Per day	2,193 cubic yards.	1,641 cubic yards.	990.7 cubic yards.	364.3 cubic yards.

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PLANT.				
Discharge pipe in use	640 to 780 feet	250 feet	1,000 feet	90 feet.
Diameter of discharge pipe	17 inches	15 inches	12 inches	10 inches.
Number of pontoons in use per 100 feet of pipe line.	2	10	3½ pair	None.
Material of pontoon	Fir	Wood	Yellow pine	
Length of pontoons	38 feet	16 feet	16 feet	
Beam of pontoons	12 feet	4 feet	3 feet	
Depth of pontoons	2 feet 6 inches	1 foot 9 inches	3 feet 4 inches	
Draft of pontoon with discharge pipe empty.	10 inches	9 inches	14 inches	
Draft of pontoon with discharge pipe full.	12 inches	13 inches	20 inches	
Revolutions per minute of propelling engines.		23		21.
Revolutions per minute of pumping engines.	230	240	265	127.
Revolutions per minute of cutter head		10		
Average boiler pressure (gauge)	150 pounds	135 pounds	110 pounds	100 pounds.
Kind of coal used	Bituminous (Pittsburg)	Bituminous	Fuel oil	Pine wood fuel.
Average vacuum in suction pipe	20 inches	12 inches	18 inches	
Average gauge pressure in discharge pipe.	18 pounds	14 pounds		
Draft of dredge:				
Forward	38 inches	4 feet	3 feet	4.3 feet.
Aft	36 inches	4 feet 3 inches	3 feet 6 inches	4.3 feet.
Displacement of dredge	250 tons	504 tons		95 tons.
Number of crew	15	30 to 32	15 (2 crews)	11.
TOWBOATS.				
Name of tug attached to dredge	Ada			
Number of crew	4			
Displacement in tons	40 tons			
Draft:				
Forward	2 feet			
Aft	2 feet			
LAUNCHES.				
Name			Sextant	Mac.
Length			30 feet	27 feet.
Beam			6 feet	6 feet.
Depth			4 feet	3 feet.
Draft			2 feet 6 inches	2 feet 3 inches
Displacement in tons				3 tons.
BARGES.				
Number of barges in use	2	2	3	
Usage	Coal	Coal lighters	Water and fuel oil	
Displacement, light	52 tons	57 tons		
Capacity all barges	150 tons	200 tons		

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TABLE II.—*Partial report of the operations of certain of the pipe-line hydraulic dredges belonging to the Engineer Department, U. S. Army, for the fiscal year ended June 30, 1910*—Continued.

Name	*Pelee.*	*Pettus.*	*Port Arthur.*	*Suwanee.*	
DISTRIBUTION OF EFFECTIVE WORKING TIME.					
Pumping	145 hours 30 minutes	2,140 hours	4,290 hours 45 minutes	1,467 hours.	
Handling pipe line			274 hours 15 minutes	4 hours.	
Handling swinging wires			39 hours 50 minutes		
Waiting for vessels to pass	7 hours 30 minutes		251 hours		
DISTRIBUTION OF TIME LOST.					
Changing location of plant	33 hours		169 hours 30 minutes	57 hours.	
Bad weather			115 hours 10 minutes	49 hours.	
Washing boilers and ordinary repairs	50 hours		212 hours	53 hours.	
Extraordinary repairs			1 month and 20 days	211 hours.	
Taking fuel and water				11 hours.	
Other causes			482 hours 40 minutes	338 hours.	
Sundays and holidays	64 hours		55½ days	440 hours.	
COST OF WORK.					
Dredge.					
Pay rolls	$868.80	$18,122.77	$9,144.81	$5,968.05	
Coal for boilers	390.00	4,457.30	a 5,270.51	2,022.90	
Coal for galley	4.87		18.50		
Water			43.40	2.50	
Supplies, subsistence	150.75	5,095.68	1,804.52	1,528.40	
Supplies, engine room		419.96	433.03	168.93	
Other supplies		1,268.84	189.00	393.28	
Renewals or addition to outfit		8,755.14	602.86	5.10	
Ordinary repairs		208.60	162.92	1,701.10	
Laundry, ice, miscellaneous expenses	150.00	159.56	143.82	305.41	
Total	$1,564.42	$38,487.85	$17,813.37		$12,115.67
Towboats and launches.					
Pay rolls	290.00				
Coal for boiler	103.00		Included in above		
Supplies, subsistence	40.20				
Supplies, engine room				217.57	
Laundry, ice, miscellaneous expenses, etc.	15.00				
Total	448.20				217.57
Total field cost	2,012.62	38,487.85	17,813.37		12,333.24

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Total field cost per cubic yard	$0.044	$0.126	$0.074	$0.178	
Office expenses, superintendence, surveys, etc.			1,381.04	652.60	
Extraordinary repairs to dredge			4,849.52		
Extraordinary repairs to barges			1,395.23		
			7,625.75		652.60
Total			25,439.12		12,985.84
Gross cost per cubic yard			$0.105		$0.18759
Coal consumed	101 tons	1,537 tons	5,593.57 barrels oil		
Cost of coal	$4.875 to $5.15 per ton	$2.90 per ton	$0.9422 per barrel		
Remarks	The above report is for the month of June, 1910. The Pelee worked during the fiscal year 1910 only 122 days and moved 156,671 cubic yards of material, mostly sand, at six localities.		[a] Fuel oil was used instead of coal.		

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TABLE II.—*Partial report of the operations of certain of the pipe-line hydraulic dredges belonging to the Engineer Department, U. S. Army, for the fiscal year ending June 30, 1910*—Continued.

Name	*Uncle Sam.*	*Vesuvius.*	*Number Four.*	*Number Five.*
When built	1899	1909		1906.
Where built	Jersey City, N. J	Fountain City, Wis		Superior Entry, Wis.
Builder		United States		United States.
Time to build		1 year		3 months.
Material of hull	Wood	Creosoted open-tank fir		Wood.
Contract cost	$18,855.94	$29,996		$14,155.32.
Cost of outfit	$3,208.16	$3,036		$10,698.65.
Length	85 feet	120 feet	120 feet	74 feet.
Beam	34 feet	26 feet	30 feet	24 feet.
Depth	7 feet	5 feet	7 feet 6 inches	5 feet.
Number, size, and type of propelling engines.	12 x 26 x 12 inch compound engines.	Ideal engines, 250-horse power		
Number, size, and type of pumping engines.		Morris 15-inch centrifugal pump.		Double 12 x 12 inch Morris, 15-inch centrifugal pump, 50-inch impeller.
Number and type of boilers	1 Scotch boiler	2 Bonson boilers		One 150-horsepower, horizontal, fire box, locomotive type.
Length of boilers	11 feet	16 feet		
Diameter of boilers	10 feet	60 inches		
WORK PERFORMED.				
District to which dredge belongs				
Location of dredging	Deep Water Point and Artificial Island, Delaware River.	Galena River	Chattahoochee River, Ga., and Ala.	Crib foundation, breakwater heads, Superior Entry, Wis.
Depth before dredging, average	18 feet	2.5 feet	2 feet	29 feet.
Depth after dredging, average	28 feet	8 feet	4 feet	35 feet.
Character of material dredged	Mud, sand, gravel, and cobble.	Mud	Sand, gravel, and mud	Fine sand.
Average number of cuts per hour		3½ feet	8	
Width of cuts		3 feet	40 feet	44 feet.
Total length of cuts		162 feet	100 to 1,200 feet	620 feet.
Cutting speed per minute:				
To port		9 feet	4 feet	
To starboard		do	do	
Rate of advance per hour		10 feet	20 feet	
Amount dredged during year	274,992 cubic yards	72,799 cubic yards during month.	75,575 cubic yards	8,200 cubic yards.
Average amount dredged.				
Per hour	136 cubic yards	157 cubic yards	60 cubic yards	
Per day	1,752 cubic yards	3,140 cubic yards	480 cubic yards	364 cubic yards.

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PLANT.				
Discharge pipe in use	1,500 feet	162 feet	90 feet	200 feet.
Diameter of discharge pipe	12 inches	17 inches	12 inches	15 inches.
Number of pontoons in use per 100 feet of pipe line.	4			5.
Material of pontoon	Wood	Wood		Barrel.
Length of pontoons	20 feet	36 feet		18 feet.
Beam of pontoons	12 feet	12 feet		8 feet.
Depth of pontoons	2 feet 3 inches	2 feet 3 inches		3 feet.
Draft of pontoon with discharge pipe empty.	11 inches	0.7 feet		1 foot 4 inches.
Draft of pontoon with discharge pipe full.	14 inches	0.9 feet		2 feet 2 inches.
Revolutions per minute of pumping engines.	170	230		240.
Revolutions per minute of cutter head	30		275	
Average boiler pressure (gauge)	125 pounds	140 pounds		115 pounds.
Kind of coal used	Semibituminous	Soft coal, Illinois bituminous	100 pounds Bituminous	Youghiogheny run of pile.
Average vacuum in suction pipe	14 inches	27 inches		
Average gauge pressure in discharge pipe.	20 pounds	3 pounds		
Draft of dredge:				
Forward	5 feet	34 inches	3 feet	20 inches.
Aft	5 feet 2 inches	34 inches	3 feet	20 inches.
Displacement of dredge	450 tons	209 tons	309 tons	61.5 tons.
Number of crew	18 double shift, 14 single shift	16	9	5.
TOWBOATS.				
Name of tug attached to dredge		Louise	Hired tug, part time	Essayons.
Number of crew		5	2	5.
Displacement in tons				129 tons.
Draft:				
Forward		2 feet 3 inches		6 feet.
Aft		2 feet 6 inches		10 feet 6 inches.
LAUNCHES.				
Name				Chord.
Length				22 feet.
Beam				5 feet.
Depth				4 feet.
Draft				20 inches.
BARGES.				
Number of barges in use		2	One hired part time	
Usage		Coal	Coal, etc	
Displacement, light		18.75 tons		
Capacity all barges		50 tons each		

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TABLE II.—*Partial report of the operations of certain of the pipe-line hydraulic dredges belonging to the Engineer Department, U. S. Army, for the fiscal year ending June 30, 1910*—Continued.

Name	*Uncle Sam.*	*Vesuvius.*	*Number Four.*	*Number Five.*	
DISTRIBUTION OF EFFECTIVE WORKING TIME.					
Pumping	2,022 hours	464 hours	2,618 hours		
Handling pipe line	150 hours				
Handling swinging wires	30 hours				
Going to and from wharf and anchorage			112 hours		
Placing dredge	95 hours		90 hours		
Waiting for vessels to pass			100 hours		
DISTRIBUTION OF TIME LOST.					
Changing location of plant	144 hours	63 hours	110 hours		
Bad weather	57 hours		120 hours		
Washing boilers and ordinary repairs	300 hours		300 hours		
Extraordinary repairs	1,080 hours		240 hours		
Taking fuel and water			160 hours		
Other causes	373 hours		250 hours		
Sundays and holidays	1,245 hours		480 hours		
COST OF WORK.					
Dredge.					
Pay rolls	$7,367.94	$825.00	$4,839.46	$305.58	
Coal for boilers	1,839.16	481.00	731.40	321.75	
Coal for galley			20.00		
Water	18.21				
Supplies, subsistence	1,928.15	150.00	1,176.00		
Supplies, engine room	299.42	20.00	52.00	35.74	
Other supplies	1,019.19		100.00	13.75	
Renewals or addition to outfit	1,687.31		4,430.00		
Ordinary repairs	1,796.30		720.00	49.80	
Laundry, ice, miscellaneous expenses	140.24	15.00	348.00	11.00	
Total	$16,095.92	$1,591.00	$12,416.86		$737.32
Towboats and launches.					
Pay rolls				518.00	
Coal for boiler				281.25	
Supplies, subsistence				54.00	
Supplies, engine room				12.00	
Launch supplies				15.00	

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Ordinary repairs				10.00	
Laundry, ice, miscellaneous expenses, etc.				6.00	
Total			[a] 480.00	[a] 896.25	537.75
Total field cost	16,095.92	1,591.00			1,375.07
Total field cost per cubic yard		$0.022		$0.167	
Office expenses, superintendence, surveys, etc.	3,184.02	60.00	1,170.00	63.74	
Extraordinary repairs to dredge	1,403.32				
Extraordinary repairs to towboats and launches.				428.27	
	4,587.34	60.00	1,170.00		492.01
Total	20,683.26	1,651.00			1,867.08
Gross cost per cubic yard	$0.0752	$0.0227			
Coal consumed	599.5 tons	185 tons		85.5 tons.	
Cost of coal	$2.90 to $3.30 per ton	$2.60 per ton		$3.75 per ton.	
Water used	72,877 gallons				
Cost of water	25 cents per 1,000 gallons				
Remarks	24-hour days were worked July 1 to Dec. 1, 1909, and 12-hour days Dec. 1, 1909, to June 30, 1910, or 153 days of 24 hours and 212 days of 12 hours; total hours, 6,216.	The above report for a period of about one month, Sept. 21 to Oct. 22, 1909. The Vesuvius was in commission during the fiscal year ending June 30, 1910 (with double crew about half the time), 159 days, during which time she worked at four different localities at which the material was mud and sand. Made 10,026 linear feet of cuts (of an average width of 80 feet), covered a total area of 802,000 square feet, and removed 211,113 cubic yards of material.	[a] Cost for hire of towboat	[a] This amount is the total cost for tug and launch for one month. For the months, the cost is $2,688.75. The proper proportion of this cost chargeable to the dredge is not accurately known, but is estimated at one-fifth of the total cost, or $537.75. The only dredging done with this 15-inch hydraulic dredge during the fiscal year 1910 was 22½ days on dredging the trench for the breakwater heads at Superior Entry, Wis. The remainder of the time when weather was favorable the 15-inch dredge pump was used for pumping water from the eight large cribs for the breakwater head substructure, which were all handled and sunk in place between Aug. 15, 1909, and November 8, 1909.	

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TABLE III.—*Partial report of the operations of certain of the dipper and bucket dredges belonging to the Engineer Department, U. S. Army, for the fiscal year ended June 30, 1910.*

Name	*Addison.*	*Ajax.*	*Ajax.*	*Alabama.*	*Casey.*
District	Wheeling, W. Va.	Rock Island	Wilmington, N. C.	Chattanooga, Tenn.	Louisville, Ky.
Length	75 feet.	73 feet.	82 feet 6 inches.	80 feet.	87 feet.
Beam	30 feet.	30 feet.	32 feet 6 inches.	38 feet.	28 feet.
Depth	6 feet 3 inches.	8 feet.	10 feet.	6 feet 6 inches.	7 feet.
Draft:					
Forward	3 feet 4 inches.	3 feet 4¾ inches.	5 feet 9½ inches.	3 feet 6 inches.	2 feet 6 inches.
Aft	2 feet 8 inches.	1 foot 7½ inches.	5 feet 2½ inches.	do.	Do.
Displacement	160 tons.	124 tons.	400 tons.	261 tons.	110 tons.
Builders	United States.	H. S. Brown.	Copeland & Bacon built machinery; Phosphate Rock Company built hull.	A. R. Perry.	Government.
Where built	On Kanawha River.	Quincy, Ill.	Port Royal, S. C.	Hull, Chattanooga, Tenn.; machinery, Bucyrus, Ohio.	Louisville, Ky.
When built	1880.	1876.	1884.	1891.	1907.
Time to build				1 year.	3 months.
Material of hull	Wood.	Wood.	Wood.	Wood.	Wood.
Contract cost	$12,000 (built by hired labor).	$11,300.		$22,300.	
Finished cost with outfit		$11,300.	Dredge purchased with outfit in 1897 for $16,050 (excluding tug and scows).	$22,600.	$15,132.13 (without outfit).[a]
Bucket:					
Capacity		1½ cubic yards.	5 cubic yards.	24 buckets, 5 cubic feet each.	2 cubic yards.
Type	Dipper.	Dipper.	Clamshell.	Elevator.	Clamshell.
Length of boom	31 feet.	30 feet.	48 feet.		46 feet.
Boilers:					
Number	1.	1.	1.	1.	1.
Type	Locomotive.	Tubular.	Locomotive [a].	Locomotive.	Locomotive.
Size	15 feet 6 inches x 54 inches.	54 inches x 10 feet.		17 feet 6 inches x 5 feet.	80 horsepower.
Working steam pressure	130 pounds.	120 pounds.	80 pounds, built for 125 pounds.	96 pounds.	100 pounds.
Average capacity per hour	300–600 cubic yards.	40 cubic yards (clay).	170 cubic yards sand, 210 cubic yards ordinary material, 260 cubic yards mud.	100 cubic yards ordinary material.	200 cubic yards ordinary material.
Monthly operating cost	$285.09.	$1,100, including towboat	$2,552.41 [b]	$475.	$502.
Total amount dredged during the fiscal year ending June 30, 1910.	46,575 cubic yards.	41,351 cubic yards (clay).	587,411 cubic yards sand and mud, 84 logs, 231 stumps.	195,962 cubic yards silt.	92,680 cubic yards.
Location of dredging	Kanawha River.	Rock River pool.	Cape Fear River, N. C., between Wilmington and Reeves Point.	Muscle Shoals Canal, Tennessee River, Ala.	Louisville and Portland Canal.
Average cost of dredged material.		$0.21 per cubic yard.	$0.037 [c].	$0.036.	$0.0416.

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Remarks					
		Purchased second hand in 1878, and worked in hard clay during 1910, all the year in Rock River.	[a] One locomotive type boiler, with 2 fire boxes; inside length between heads 18 feet 11¾ inches; inside width of fire box, 6 feet 10¾ inches; grate surface, 27½ square feet; heating surface, 1,441 square feet; built in 1906 for working pressure of 125 pounds per square inch; works only 80 pounds. [b] Cost of operation for one year was $14,134.31; operating tugs towing material, $7,561.14; total, $21,695.45. Three and one-half months spent in making special repairs costing $6,750.32, which amount is not included in this cost. [c] This cost of $0.037 allows nothing for removal of logs and stumps and does not include the amount of repairs. Including the cost of superintendence, main office expenses, etc., $4,880, for deterioration of plant, $5,000, the cost per cubic yard is $0.054. This amount of deterioration is 10 per cent of the value, special repairs not included.		[a] Finished cost with outfit not known.

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TABLE III.—*Partial report of the operations of certain of the dipper and bucket dredges belonging to the Engineer Department, U. S. Army, for the fiscal year ended June 30, 1910*—Continued.

Name	*Cheraw.*	*Col. Farquhar.*	*Frontenac.*	*Green River.*	*Guadalupe.*
District	Charleston, S. C.	Grand Rapids, Mich.	Oswego, N. Y.	Louisville, Ky.	Galveston, Tex.
Length	150 feet.	76 feet.	76 feet.	112 feet.	118 feet.
Beam	28 feet.	24 feet.	26 feet.	31 feet.	29 feet.
Depth	8 feet bow, 7 feet 6 inches stern; 6 feet 9 inches amidship.	6 feet.	6 feet 7 inches.	4 feet.	5 feet 9 inches.
Draft:					
Forward	4 feet 6 inches (approximate).	5 feet.	3 feet all around, when coaled.	2 feet 9 inches.	3 feet 3 inches.
Aft				do.	4 feet.
Displacement			173 tons.	298.4 tons.	303 tons.
Builders	Harlan & Hollingsworth Co.	—— Dodge.	Osgood Dredge Co.	United States.	U. S. Engineer Department (with hired labor).
Where built	Wilmington, Del.	Grand Haven, Mich.	Oswego, N. Y.	Rumsey, Ky.	Victoria, Tex.
When built	1906.	1869.	1891.	1890; hull rebuilt 1896.	1908.
Time to build	1 year 6 months.				
Material of hull	Steel.	Wood.	Wood.	Wood.	Wood.
Contract cost	$18,000 a.		$14,650.	$4,093.69.	
Finished cost with outfit	$45,500.	$15,500 cost; purchased when new, or nearly new.	$15,000.	(a)	$38,077.50.
Bucket:					
Capacity	3 cubic yards, grapple bucket, and 1¾ cubic yards, dipper.	2 cubic yards.	1½ cubic yards.	1½ cubic yards.	1½ cubic yards.
Type		Dipper.	Dipper.	Dipper.	Clamshell.
Length of boom	58 feet 6 inches.	40 feet.	26 feet.	60 feet.	46 feet.
Boilers:					
Number	2.	1.	1.	1.	2.
Type	Under fired, return-tube.	Marine.	Locomotive.	Locomotive.	Scotch marine.
Size	150 horsepower each.	10 x 5 feet.	15 x 4 feet.	4 x 14 feet.	7 feet 6 inches x 10 feet.
Working steam pressure	100 pounds.	80 pounds.	90 pounds.	110 pounds.	150 pounds.
Average capacity per hour	240 cubic yards ordinary material.	65 cubic yards, usually hard material.	50 cubic yards ordinary material.	50 cubic yards ordinary material.	100 cubic yards ordinary material.
Monthly operating cost	$1,600.	$1,000.	$1,100 a.	$495.	$1,715.
Total amount dredged during the fiscal year ending June 30, 1910.	63,031 cubic yards.	80,331 cubic yards (place measurement).	75,425 cubic yards (scow measurement).	18,627 cubic yards.	9,300 cubic yards sand and gravel. a
Location of dredging	16,940 cubic yards Great Pedee River, 46,091 cubic yards Waccamaw.	Grand River, Mich.		Green and Barren rivers, Ky.	Guadalupe River, Tex.
Average cost of dredged material.	$0.088.	$0.1152.	$0.132.	$0.16.	$0.1418.

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Remarks.....	a Hull, A-frame, stays, boom, and turntable.	The cost of dredging includes handling a second time in a ¾ cubic yard bucket, swung by a derrick with 70-foot boom, and deposited on bank about 100 feet from dredge; also all cost of repairs during fiscal year to entire outfit, dredge, derrick, tugs, etc., and cost of towing. The hull of dredge is practically worn out and will probably be unsafe to use after calendar year 1910.	a Includes operating expenses, laying up, fitting out, and repairs to hull and machinery during fiscal year.	a Finished cost with outfit unknown.	a Operated most of time as a snagboat. This is a combination bucket dredge and snagboat. Laid up January 15, 1910 to end of fiscal year.

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TABLE III.—*Partial report of the operations of certain of the dipper and bucket dredges belonging to the Engineer Department, U. S. Army, for the fiscal year ended June 30, 1910*—Continued.

Name	*Hell Gate.*	*Hercules.*	*Kentucky.*	*Kwasind.*	*Louisville.*
District	Philadelphia, Pa.	Wilmington, N. C.	Chattanooga, Tenn.	Chattanooga, Tenn.	Louisville, Ky.
Length	110 feet.	100 feet.	80 feet.	80 feet.	71 feet.
Beam	35 feet.	38 feet.	34 feet.	28 feet.	28 feet.
Depth	12 feet.	11 feet 4 inches.	6 feet 10 inches.	6 feet 6 inches.	6 feet.
Draft:					
Forward	6 feet.	5 feet.	4 feet 6 inches.	3 feet.	2 feet 4 inches.
Aft	do.	7 feet.	3 feet.	do.	Do.
Displacement	720 tons.	670 tons.	354.2 tons.	195.6 tons.	79 tons.
Builders	Packard.	Theo. Smith & Sons Co., Jersey City, N. J.	The Bucyrus Co.	Osgood Dredge Co.	Burnet & Co.
Where built	New York, N. Y.	Jersey City, N. J.	Hull, Chattanooga, Tenn.; machinery, Bucyrus, Ohio.	Hull, Knoxville, Tenn.; machinery, Albany, N. Y.	Cincinnati, Ohio.
When built	1869.	1907.	1900.	1899.	1886.
Time to build		6 months.	1 year.	1 year.	4 months.
Material of hull	Wood.	Wood.	Wood.	Wood.	Iron.
Contract cost		$61,350.	$34,300.	$11,000.	$25,000.
Finished cost with outfit		$64,546.04 (not including tug and scows).	$35,150 (approximate).	$11,250 (approximate)	$25,000 (without outfit).
Bucket:					
Capacity	1 clamshell, 6 cubic yards; 1 clamshell, 7 cubic yards.	7 cubic yards.	1 2 cubic yards; 1 4 cubic yards.	1 1½ cubic yards.	2 cubic yards.
Type	1 orange peel, 6 cubic yards.	Clamshell.	Dipper.	Dipper.	Dipper.
Length of boom	50 feet; hoist above water, 33 feet.	55 feet.	45 feet.	38 feet.	42 feet.
Boilers:					
Number	1.	1.	1 vertical, 66 x 24 inches; 1 locomotive, 20 feet x 56 inches.	1.	1.
Type	Marine leg.	Locomotive[a]		Fire box.	Locomotive.
Size	60 horsepower.			12 x 3 feet.	50 horsepower.
Working steam pressure	70 pounds.	Built for 125 pounds; carries only 90 pounds.	100 pounds.	120 pounds.	100 pounds.
Average capacity per hour	100 cubic yards ordinary material.	195 cubic yards sand, 250 cubic yards ordinary material, 290 cubic yards mud.	175 cubic yards ordinary material.	75 cubic yards ordinary material.	90 cubic yards ordinary material.
Monthly operating cost	$2,368.	$2,536.46[b]	$1,050 with double crew.	$1,000.	$450.
Total amount dredged during the fiscal year ending June 30, 1910.	386 cubic yards overlying material, 3,244 cubic yards rock.	192 logs, 347 stumps, 899,500 cubic yards sand and mud.	281,360 cubic yards gravel.	42,805 cubic yards hard material.	82,010 cubic yards.
Location of dredging	Schooner Ledge Rock, Delaware River.	Cape Fear River, N. C., between Wilmington and Reeves Point.	Tennessee River below Riverton.	Tennessee River above Chattanooga.	Louisville and Portland Canal.
Average cost of dredged material.	$9.69 (and blasted material).	$0.042[c]	$0.05.	$0.225.	$0.0641.

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Remarks.....	640 holes 3 inches in diameter drilled in submarine rock; total length of holes, 2,754.8 feet; 1,000 cubic yards blasted and broken up; character of work was removal shoal spots of limited area and a depth of from 0.1 to 3.5 feet from the surface of a rock which had been previously blasted and dredged; no straight-away work done. Hoisting engines 18½ x 24 inches; 160 revolutions per minute; drum 26 inches. Vessel on 24-hour-day basis from July 1, 1909, to June 12, 1910, inclusive, then on 12-hour day.	a With 2 fire boxes; length between heads, outside to outside, 22 feet 10½ inches; outside width of fire box, 7 feet; grate surface, 87 square feet; heating surface, 1,935 square feet; built in 1907 for a working pressure of 125 pounds per square inch. b Cost of operating this dredge and its plant during fiscal year, working day and night for three months of time and during day only for the remaining nine months, was: Operating dredge, $23,192.90; operating tugs, towing, $14,853.94; total, $38,046.84. Average cost of operating dredge and plant for twelve months during day and three months during night was $2,536.46 (i. e., fifteen months). c This cost of $0.042 allows nothing for removal of logs and stumps. Adding to this the cost of superintendence, main office expenses, etc., $6,605, and $9,000 for deterioration of plant (10 per cent of value), the cost is $0.06.	Rebuilt in 1908.....	Rebuilt in 1908.....	Rebuilt in 1908.....	a Finished cost with outfit not known.

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TABLE III.—*Partial report of the operations of certain of the dipper and bucket dredges belonging to the Engineer Department, U. S. Army, for the fiscal year ended June 30, 1910*—Continued.

Name	*Malta.*	*Maumee.*	*Phoenix.*	*Scuppernong.*	*Tennessee.*
District	Cincinnati, Ohio	Cleveland, Ohio	Rock Island, Ill	Wilmington, N. C	Chattanooga, Tenn.
Length	70 feet	100 feet	80 feet	78 feet	80 feet.
Beam	31 feet 4 inches	36 feet	30 feet	32 feet	34 feet.
Depth	6 feet 10 inches	11 feet	8 feet	7 feet	6 feet 10 inches.
Draft:					
Forward	3 feet 6 inches	7 feet 6 inches	3 feet 7 inches	3 feet	4 feet 4 inches.
Aft	3 feet	3 feet 3 inches	2 feet 6 inches	do	3 feet 2 inches.
Displacement	160 tons	533 tons, without coal	186 tons	220 tons	398.2 tons.
Builders	The Bucyrus Co	Murphy & Miller	A. Cutting	United States (hired labor)	Hull, United States; machinery, The Bucyrus Co.
Where built	Muskingum River and Bucyrus, Ohio.	Cleveland, Ohio	Metropolis, Ill	Newbern, N. C	Hull, Muscle Shoals Canal; machinery, South Milwaukee, Wis.
When built	1888	1893	1885	1904	1910.
Time to build	7 months		9 months	5 months	1 year 2 months.
Material of hull	Wood	Wood	Wood	Wood	Wood.
Contract cost	$13,000		$16,600	$15,000	Machinery, $19,850; hull (hired labor), $9,840.
Finished cost with outfit	$17,000	Rebuilt in 1909, at cost of $41,992.89	$19,525	$16,500	$37,500.
Bucket:					
Capacity	24, 3 cubic feet each	3½ cubic yards	2½ cubic yards	2½ cubic yards	2, 1½, and 2 cubic yards.
Type	Endless chain on ladder.	Dipper	Dipper	Clamshell	Dipper.
Length of boom		42 feet 6 inches	34 feet	55 feet banking, 42 feet dredging in scows.	44 feet.
Boilers:					
Number	1	2	1	1	1.
Type	Locomotive	Locomotive, straight flue	Fire box	Locomotive	Locomotive.
Size	17 feet 4 inches x 48 inches diameter.	19 feet 3 inches x 4 feet 6 inches	15 feet 4 inches x 60 inches.	100 horsepower	20 feet x 66 inches.
Working steam pressure	90 to 100 pounds	70 pounds	125 pounds	85 pounds	125 pounds.
Average capacity per hour	120 cubic yards	150 cubic yards ordinary material	70 cubic yards clay	Ordinary material: 48 cubic yards banking, 87 cubic yards scow.[a]	200 cubic yards ordinary material.
Monthly operating cost	$1,187.24, including tender.	$2,200	$1,100, including towboat.	$1,623.95[b]	$1,525, with double crew.
Total amount dredged during the fiscal year ending June 30, 1910.	112,650 cubic yards	22,175 cubic yards[a]	27,064 cubic yards clay (three months).	In scows, 82,437 cubic yards; banking, 27,778 cubic yards; total, 110,215 cubic yards.	10,700 cubic yards gravel.

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Location of dredging	Muskingum River	Conneaut, Cleveland, and Sandusky harbors.	Rock River pool	Neuse River, Scuppernong River, waterway from Beaufort Harbor to New River, waterway from New River to Swansboro.	Tennessee River between Chattanooga and Riverton.
Average cost of dredged material.	$0.0985	$0.225 [b]	$0.12	$0.0886 in scows, $0.156 banking [c]	$0.06.
Remarks		[a] During early part of year vessel was being rebuilt and repaired. During latter part of year she was engaged in jetty construction. [b] Cost per yard was greatly increased by the fact that at no time during the year was the dredge engaged upon ordinary digging. Her work was largely that of "cleaning" channels previously dredged, the removal of bowlders therefrom, etc.	July 1 to end of season, 1909, worked in broken rock and desultory dredging, for which no accurate statements can be given.	[a] Difference in capacity of dredge per hour is accounted for by fact that the work on which banking was done was in a very light cutting, and place measurement is given; where scows were used cutting was much heavier, and scow measurement is given. [b] Four months' dredging in scows and three months and five days' banking. Remainder of time dredge was undergoing repairs, working for private parties, and was laid up on account of lack of funds. [c] This cost includes superintendence, towing plant to and from the different jobs, and extraordinary repairs to the dredge.	Dredge at work only 6 days in fiscal year.

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TABLE III.—*Partial report of the operations of certain of the dipper and bucket dredges belonging to the Engineer Department, U. S. Army, for the fiscal year ended June 30, 1910*—Continued.

Name	*Vulcan.*	*Wabash.*	*No. 1.*	*No. 1.*	*No. 1.*
District	Rock Island, Ill.	Louisville, Ky.	Charleston, S. C.	Cincinnati, Ohio.	Galveston, Tex.
Length	80 feet.	80 feet.	86 feet.	80 feet.	65 feet.
Beam	30 feet.	26 feet.	30 feet.	30 feet.	27 feet.
Depth	8 feet.	6 feet 9½ inches.	8 feet.	6 feet 9 inches.	5 feet 6 inches.
Draft:					
Forward	4 feet.	2 feet 4 inches.	5 feet.	4 feet 6 inches.	2 feet 6 inches.
Aft	3 feet 2½ inches.	2 feet.		3 feet.	3 feet.
Displacement	240 tons.	140 tons.		280 tons.	115.34 tons.
Builders	Osgood Dredge Co.	Rebuilt by United States.		The Bucyrus Co., South Milwaukee, Wis.	John L. Bludworth.
Where built	Davenport, Iowa.	Rebuilt at Louisville, Ky.		Jeffersonville, Ind.	Galveston, Tex.
When built	1883.	Rebuilt 1900.	Purchased by United States in 1892 (then nearly new).	1901.	1908.
Time to build	9 months.				3 months.
Material of hull	Wood.	Wood.	Wood.	Wood.	Wood.
Contract cost			$4,000 (hull).	$22,272.	$2,150.
Finished cost with outfit	$19,450.	$7,526.88 (without outfit)a.	$18,000.	Equipment transferred from old dredge.	$8,826.77.
Bucket:					
Capacity	2½ cubic yards.	1½ cubic yards.	1⅜ cubic yards.	2½ cubic yards.	1½ cubic yards.
Type	Dipper.	Dipper.	Dipper.	Dipper.	Clamshell.
Length of boom	34 feet.	34 feet.	60 feet.	40 feet.	48 feet.
Boilers:					
Number	1.	1.	1.	1.	1.
Type	Fire box.	Locomotive.	Underfired, return-tube.	Fire box, tubular.	Vertical.
Size	60 inches x 16 feet 10 inches.	60 horsepower.		16 feet x 54 inches.	8 feet 6 inches high x 53 inches.
Working steam pressure	106 pounds.	80 pounds.	80 pounds.	110 pounds.	100 pounds.
Average capacity per hour	100 cubic yards sand.	50 cubic yards ordinary material.	120 cubic yards in solid cut.	90 cubic yards ordinary material.	100 cubic yards ordinary material.
Monthly operating cost	$1,100.	$160.60.	$1,000.	$600.	$1,250.
Total amount dredged during the fiscal year ending June 30, 1910.	Broken rock, 9,737 cubic yards; rock and mud, 2,758 cubic yards; mud, 871 cubic yards; total, 13,366 cubic yards.	16,570 cubic yards.	17,419 cubic yards.	30,588 cubic yards.	13,421 cubic yards.
Location of dredging	Moline pool.	Louisville and Portland Canal.	Esthervill-Minim Creek Canal.	Kentucky River.	Dredging only during part of three months in Galveston Bay and Guadalupe River.

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Average cost of dredged material.	Rock mixed with mud, $0.75; rock, broken, $0.63; mud, $0.13.	$0.0403	$0.068	$0.2062	$0.15.
Remarks	Dredge worked in broken rock, rock mixed with mud, and mud during year. Average capacity per hour in broken rock, 8.9 yards, all measurements solid yards, by displacement. Loose rock piled up measures about double.				

a Finished cost with outfit not known.

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TABLE III.—*Partial report of the operations of certain of the dipper and bucket dredges belonging to the Engineer Department, U. S. Army, for the fiscal year ended June 30, 1910*—Continued.

Name	*No. 1.*	*No. 1.*	*No. 1.*	*No. 1.*	*No. 2.*
District	Milwaukee, Wis.	Montgomery, Ala.	Pittsburg, Pa.	Portland, Oreg., second district.	Cincinnati, Ohio.
Length	79 feet	86 feet	85 feet	78 feet	72 feet.
Beam	33 feet	30 feet	32 feet	34 feet	19 feet.
Depth	7 feet 4 inches	6 feet 5 inches	6 feet 9 inches	5 feet 6 inches	5 feet 5 inches.
Draft:					
Forward	5 feet	3 feet	4 feet 6 inches	2 feet 8 inches	3 feet 6 inches.
Aft	3 feet 4 inches	do	3 feet 6 inches	do	2 feet 6 inches.
Displacement	319 tons	225 tons	332 tons	221 tons	128 tons.
Builders	United States	M. A. Sweeney Ship Yard and Foundry Co.	M. A. Sweeney Ship Yard and Foundry Co.	Cascade Construction Co.	Hull, U. S. Engineer Department; machinery, Marion Steam Shovel Co.
Where built	Chicago, Ill.	Columbus, Ga.	Jeffersonville, Ind.	Portland, Oreg.	Hull, Frankfort, Ky.; machinery, Marion, Ohio.
When built	1872	1900	1903	1895; hull rebuilt 1906	1908.
Time to build	6 months	8 months	6 months		9 months.
Material of hull	Wood	Wood	Wood	Wood	Wood.
Contract cost				Purchased from Cascade Construction Co., Portland, Oreg., 1902, for $2,500.	Built by hired labor and purchase of machinery for $10,193.26.
Finished cost with outfit	$29,500	$12,712.92			Equipment transferred from old dredge.
Bucket:					
Capacity	1 1¾ cubic yards; 1 2½ cubic yards.	1½ cubic yards, with 4 teeth.	1 2.3 cubic yards; 1 3 cubic yards.	1½ cubic yards	Three-fourths of a cubic yard.
Type	Dipper	Dipper	Dipper	Clamshell	Dipper.
Length of boom	35 feet	32 feet	40 feet	60 feet	27 feet.
Boilers:					
Number	1	1	2	1	1.
Type	Locomotive, fire box	Locomotive, fire box	1 locomotive and 1 vertical	Return tubular	Fire box, tubular.
Size	14 feet 6 inches x 4 feet 6 inches.	75 horsepower	60 horsepower and 10 horsepower.	12 feet x 84 inches	15 feet x 50 inches.
Working steam pressure	90 pounds	100 pounds	110 pounds	90 pounds	125 pounds.

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Average capacity per hour.	100 cubic yards ordinary material	75 cubic yards	Average conditions, 100 cubic yards; good conditions, 200 cubic yards.	Dredge not in commission during fiscal year 1910.	50 cubic yards ordinary material.
Monthly operating cost	$2,200	$558.50	$923.08, dredge; $1,380, tender (steamboat).		$525.
Total amount dredged during the fiscal year ending June 30, 1910.	207,902 cubic yards (dipper measure) sand, clay, and mud.	86,742 cubic yards	61,910 cubic yards in five months[a]		25,373 cubic yards.
Location of dredging	Fox River below Depere, Wis.; Kewaunee, Wis.; Menominee, Mich.; Sturgeon Bay, Wis.; Port Washington, Wis.; Racine, Wis.; Kenosha, Wis.; Waukegan, Ill.	Chattahoochee and Apalachicola rivers, Ga., Fla., and Ala.	Monongahela River		Lock entrances, Kentucky River.
Average cost of dredged material.	$0.106	$0.08	[b]		$0.2284.
Remarks	Cost per cubic yard includes towing of plant and disposal of dredged material.		[a] Much of time was applied to construction work, where actual dredging was of intermittent character, thus accounting for small yardage and comparatively high unit cost. [b] Average cost of dredging per cubic yard: Five months for dredge only, $0.0746; five months for dredge and tender, $0.186; twelve months for dredge only, $0.179; twelve months for dredge and tender, $0.4464.		

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TABLE III.—*Partial report of the operations of certain of the dipper and bucket dredges belonging to the Engineer Department, U. S. Army, for the fiscal year ended June 30, 1910*—Continued.

Name	No. 1.	No. 2.	No. 2.	No. 3.	No. 4.
District	Montgomery, Ala.	Pittsburg, Pa.	Portland, Oreg., second district.	Montgomery, Ala.	Milwaukee, Wis.
Length	75 feet.	86 feet 6 inches.	80 feet.	75 feet.	90 feet.
Beam	26 feet 4 inches.	30 feet.	30 feet.	26 feet.	32 feet.
Depth	5 feet 6 inches.	5 feet.	5 feet.	7 feet.	7 feet.
Draft:					
Forward	4 feet.	3 feet 2 inches.	2 feet 10 inches.	3 feet.	3 feet 8 inches.
Aft	3 feet 6 inches.	2 feet 6 inches.	2 feet 7 inches.	do.	2 feet.
Displacement	230 tons.	222 tons.	200 tons.	180 tons.	255 tons.
Builders	M. A. Sweeney Ship Yard and Foundry Co.	Purchased from Evansville Contract Co., second-hand.	Jos. Supple.	Engineer Department.	Purchased by United States in 1876.
Where built	Mobile, Ala.	Parkersburg, W. Va.	Portland, Oreg.	Near Lock 4, Coosa River, Ala.	
When built	1902.	1905.	1904.	1902; hull practically rebuilt 1908.	
Time to build	5 months.		3½ months.	4 months.	
Material of hull	Wood.	Wood.	Wood.	Wood (creosoted).	Wood.
Contract cost	$13,440.	$18,600 (second-hand).	Hull and house, $6,350; machinery, $12,850.		
Finished cost with outfit	$13,440.	$21,600[a].	$20,200.	$17,000.	$13,000.
Bucket:					
Capacity	1½ cubic yards.	1 1½ cubic yards; 1 2½ cubic yards.	1 cubic yard.	1 cubic yard.	1 2½ cubic yards; 1 1 cubic yard.
Type	Bottom dump (dipper).	Dipper.	Dipper.	Dipper.	Dipper.
Length of boom	30 feet.	35 feet.	40 feet.	28 feet.	39 feet.
Boilers:					
Number	1.	2.	1.	1.	1.
Type	Locomotive.	1 locomotive and 1 vertical.	Locomotive.	Internal furnace, water back.	Locomotive, fire box.
Size		60 horsepower and 15 horsepower.	15 feet 4 inches x 42 inches.	60 horsepower.	13 feet 10 inches x 4 feet 6 inches.
Working steam pressure	100 pounds.	100 pounds.	90 pounds.	160 pounds.	90 pounds.
Average capacity per hour	120 cubic yards ordinary material.	Average conditions, 67 cubic yards; good conditions, 134 cubic yards.	60 cubic yards ordinary material.	100 cubic yards ordinary material.	70 cubic yards ordinary material.
Monthly operating cost	$585.	$885.90, dredge; $903, tender (steamboat).	$800.	$900.	$506.50.
Total amount dredged during the fiscal year ending June 30, 1910.	27,520 cubic yards.	62,706 cubic yards in nine months[b]	18,087 cubic yards.	17,500 cubic yards.	Clay and sand, 78,960 cubic yards; stone, 19,656 cubic yards; total, 98,616 cubic yards.
Location of dredging	Alabama River, Ala.	Monongahela, Allegheny, and Ohio rivers.	Upper Willamette River.	Coosa River, between Rome, Ga., and Lock No. 4, Ala.	Upper Fox River (clay and sand); Lower Fox River (stone).

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Average cost of dredged material.	$0.1087	(c)	$0.10	$0.099	$0.0319, Upper Fox River; $0.1726, Lower Fox River.
Remarks		a Cost of cabin built by United States, $1,000. b Much of time was applied to construction work, where actual dredging was of intermittent character, thus accounting for small yardage and comparatively high unit cost. c Average cost of dredging per cubic yard: Nine months, dredge only, $0.1272; nine months, dredge and tender, $0.2853; twelve months, dredge only, $0.1696; twelve months, dredge and tender, $0.3423.			Purchased in 1876 by United States and was originally a clamshell dipper dredge; rebuilt by United States in 1890-91 and changed into a scoop-dipper dredge at cost of $15,060. Cost per cubic yard includes towing and disposal of dredged material.

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TABLE III.—*Partial report of the operations of certain of the dipper and bucket dredges belonging to the Engineer Department, U. S. Army, for the fiscal year ended June 30, 1910*—Continued.

Name	*No. 5.*	*No. 6.*	*No name.*	*No name.*
District	Milwaukee, Wis.	Montgomery, Ala.	Milwaukee, Wis.	Nashville, Tenn.
Length	100 feet.	70 feet.	75 feet.	80 feet.
Beam	30 feet.	30 feet.	31 feet.	30 feet.
Depth	6 feet.	4 feet 9 inches.	6 feet.	7 feet.
Draft: Forward	1 foot 8 inches.	1 foot 6 inches.	4 feet 8 inches.	3 feet 11 inches.
Aft	2 feet 1 inch.	do.	do.	2 feet 6 inches.
Displacement	175 tons.	207.5 tons.	260 tons.	200.5 tons.
Builders	United States.	Engineer Department.	Bucyrus Co., South Milwaukee, Wis.	Featherstone Foundry and Machine Co.
Where built	Portage.	Columbus, Ga.	Hull, Green Bay; machinery, South Milwaukee, Wis.	Jeffersonville, Ind.
When built	1878.	1908.	1906.	1903.
Time to build		4 months.	1 year 3 months.	8 months.
Material of hull	Wood.	Wood.	Wood.	Wood.
Contract cost			$39,000.	$18,650.
Finished cost with outfit	$5,500.	$11,730.84.	$39,529.	$18,950.
Bucket: Capacity	1 2½ cubic yards.	1 cubic yard.	38 5 cubic feet each.	1½ cubic yards.
Type	Grapple (Lancaster).	Orange-peel.	Chain bucket with teeth.	Dipper.
Length of boom	60 feet.	60 feet.		
Boilers: Number	1.	1.	1.	1.
Type	Scotch marine (Adamson furnace).	Vertical.	Scotch marine (Adamson furnace).	Locomotive.
Size	10 feet 8 inches x 7 feet.	30 horsepower.	10 x 9 feet.	12 feet 6 inches x 42 inches.
Working steam pressure	100 pounds.	100 pounds.	125 pounds.	100 pounds.
Average capacity per hour	80 cubic yards ordinary material.	50 cubic yards ordinary material.	200 cubic yards ordinary material.	75 cubic yards ordinary material.
Monthly operating cost	$390.	$375.	$800.	$460.
Total amount dredged during the fiscal year ending June 30, 1910.	Sand and clay, 24,420 cubic yards; stone, 10,410 cubic yards; sand and stone, 10,900 cubic yards; gravel, 1,110 cubic yards; clay and mud, 1,020 cubic yards; total, 47,860 cubic yards.	11 483 cubic yards.	224,285 cubic yards muck, clay, and sand (dipper measurement).	35,425 cubic yards.
Location of dredging	(a)	Flint River, Ga.	Upper Fox River, Wis. (Lake Apuckawo).	Locks 5, 6, and 7, Cumberland River.
Average cost of dredged material.	(a)	$0.236 (rock).	$0.0278.	$0.145.
Remarks	a $0.0503, dredging bars, Upper Fox River (sand and clay); $0.1531, cleaning channel, Appleton and Cedars, Lower Fox River (stone); $0.0797, digging stone for repairs of Portage Levee (sand and stone); $0.1962, backing Cedars Dam, Lower Fox River (gravel); $0.2846, dredging Stockbridge Harbor, Lake Winnebago (clay and mud).		Elevator or chain bucket dredge with belt conveyor for transferring spoils to auxiliary scows having belt conveyors for disposing of the spoils. All conveyors are operated by electric motors.	

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TABLE IV.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department.*

[NOTE.—For further particulars see list by districts.]

CLASS A.—SEAGOING HOPPER DREDGES.

Name, number, or letter.	Tonnage.	Dimensions.			Material.	District.
		Length.	Breadth.	Depth.		
		Ft. in.	*Ft. in.*	*Ft. in.*		
Atlantic	2,674	288 0	47 6	25 0	Steel	New York.
Benyaurd	2,006	271 6	47 6	23 0	...do	New Orleans.
Burton	1,200	177 0	38 0	19 0	...do	Cleveland.
Cape Fear	204	131 3	29 0	12 0	Wood	Wilmington, N. C.
Caucus	1,400	200 0	41 0	20 0	...do	Montgomery.
Charleston	517	122 6	30 0	12 0	...do	Charleston.
Chinook	4,154	445 0	49 0	21 6	Steel	Portland, Oreg.
Clatsop	1,100	180 0	38 0	20 6	...do	Do.
Comstock, Gen. C. B.	764	177 0	35 6	16 0	Wood	Galveston.
Cumberland	1,451	200 0	40 8	20 0	...do	Savannah.
Delaware	2,750	315 0	52 0	22 6	Steel	Philadelphia.
Galveston	3,500	304 0	51 0	27 0	...do	Galveston.
Gedney	751	156 6	36 6	15 6	Wood	Newport.
Key West	499	141 0	31 0	15 0	...do	Jacksonville.
Manhattan	2,665	288 0	47 6	25 0	Steel	New York.
Meade, Gen. G. G.	1,200	177 0	38 0	19 0	...do	Grand Rapids.
Navesink	2,931	290 0	47 6	28 0	...do	New York.
Raritan	2,930	290 0	47 6	28 0	...do	Do.
Sabine	600	145 0	35 0	8 0	Wood	Dallas.
Savannah	1,236	177 0	38 0	19 6	Steel	Savannah.
St. Johns	1,047	205 0	41 0	20 0	Wood	Jacksonville.
Sumter		198 5	41 0	21 0	...do	Charleston.
Winyah Bay	466	141 0	31 6	13 0	...do	Do.

CLASS B.—HYDRAULIC PIPE LINE DREDGES.

Barnard	754	206 2	38 0	14 6	Steel	New Orleans.
Beta	1,280	214 0	58 0	6 11	...do	St. Louis.
Casey[a]	110	87 0	28 0	7 0	Wood	Louisville.
Cataract	750	140 6	40 4	10 7	...do	Philadelphia.
Congaree	385	110 0	32 0	2 6	...do	Charleston, S. C.
Dalecarlia		66 0	24 0	6 0	...do	Washington, D. C.
Delatour[a]	157	112 0	30 0	5 0	...do	New Orleans.
Delta	930	175 0	38 0	8 4	Steel	St. Louis.
Epsilon	665	157 0	40 0	7 6	...do	Do.
Etna		130 0	28 0	5 0	Wood	Rock Island.
Flad, Henry	860	192 0	44 0	7 0	Steel	St. Louis.
Florida[a]	175	131 0	28 0	7 0	...do	Jacksonville.
Gamma	640	138 0	38 0	7 10	...do	St. Louis.
Geyser		100 0	20 0	4 0	Wood	Rock Island.
Harrod, B. M.	1,160	210 0	44 0	8 6	Iron and steel.	St. Louis.
Hecla		120 0	26 0	5 0	Wood	Rock Island.
Howell, Capt. C. W.[a]	200	125 0	25 0	5 0	...do	Galveston.
Humphreys	194	100 0	32 0	8 9	...do	Mobile.
Indiana[a]	288	125 0	34 0	6 10	Steel	Cincinnati.
Iota	860	192 0	44 0	7 0	...do	St. Louis.
Jacksonville	680	138 4	40 8	10 2	Wood	Jacksonville.
Kappa	860	192 0	44 0	7 0	Steel	St. Louis.
Kissimmee	65	60 0	18 0	2 0	Wood	Jacksonville.
Ludlow, Gen.	213	162 1	36 9	3 6	Steel	Grand Rapids.
Miller, Col. A. M.	943	138 6	37 0	13 0	Wood	Galveston.
Morgan	667	137 0	38 4	8 5	Steel	Savannah.
Oregon		120 0	36 0	11 0	Wood	Seattle.
Pascagoula	349	150 0	40 0	9 6	Steel	Mobile.
Pelee		119 0	30 0	5 0	Wood	Rock Island.
Pettus	247	135 0	35 0	6 6	...do	Montgomery.
Port Arthur		60 0	28 0	6 0	...do	Dallas.
Ram	225	125 0	30 0	7 6	Steel	New Orleans.
San Pedro	400	140 8	40 8	10 7	Wood	Los Angeles.
St. Croix	130	80 0	22 0	5 0	...do	St. Paul.
Suwanee[a]	95	100 0	24 0	5 0	...do	Jacksonville.
Uncle Sam	450	85 0	34 0	7 0	...do	Philadelphia.
Vesuvius		120 0	30 0	5 0	...do	Rock Island.
Warrood	260	100 0	27 0	8 6	...do	St. Paul.
Zeta	665	157 0	40 0	7 6	Steel	St. Louis.
No. 3	372	160 0	40 0	6 0	...do	Do.
No. 3[a]	200	60 0	30 0	5 0	Wood	Portland, Oreg.
No. 4	125	100 0	28 0	6 6	...do	Montgomery.
No. 4	372	160 0	40 0	6 0	Steel	St. Louis.
No. 5	900	197 0	45 0	7 6	...do	Do.
No. 6	900	197 0	45 0	7 6	...do	Do.
No. 569	194	120 0	30 0	6 0	Wood	Vicksburg.
No name		90 0	24 0	3 6	...do	Nashville.

[a] Combination.

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TABLE IV.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department*—Continued.

CLASS C.—BUCKET AND DIPPER DREDGES.

Name, number or letter.	Tonnage.	Dimensions.			Material.	District.
		Length.	Breadth.	Depth.		
		Ft. in.	*Ft. in.*	*Ft. in.*		
Addison	160	75 0	30 0	6 3	Wood	Wheeling.
Ajax		70 0	26 0	6 0	do	Rock Island.
Ajax	175	82 6	32 6	9 3	do	Wilmington, N. C.
Alabama[a]		80 0	38 0	6 6	do	Chattanooga.
Cheraw	400	150 0	28 0	6 0	Steel	Charleston.
Farquhar, Col		76 0	24 0	6 0	Wood	Grand Rapids.
Frontenac		76 0	26 0	7 0	do	Oswego.
Green River	156	112 0	31 0	4 0	do	Louisville.
Guadalupe[b]	227	118 0	28 0	5 9	do	Galveston.
Hell Gate[c]	720	110 0	35 0	12 0	do	Philadelphia.
Hercules[c]	466	100 0	40 0	11 8	do	Wilmington, N. C.
Kentucky		100 0	34 0	6 10	do	Chattanooga.
Kwasind		80 0	28 0	6 6	do	Do.
Louisville	79	71 0	28 0	6 0	Iron	Louisville.
Malta[a]	160	70 0	31 4	6 10	Wood	Cincinnati.
Maumee		100 0	36 0	10 0	do	Cleveland.
Ohio	213	110 0	31 6	6 8	Iron	Cincinnati.
Oswego	160	92 0	31 6	6 1	do	Do.
Otter Tail	120	75 0	24 0	6 0	Wood	S. Paul.
Pheonix		80 0	30 0	8 0	do	Rock Island.
Saginaw[c]		83 9	32 0	6 7	do	Grand Rapids.
Scuppernong[c]	128	78 0	32 0	7 0	do	Wilmington, N. C.
Tennessee		100 0	34 0	6 10	do	Chattanooga.
Umatilla	481	159 9	34 4	5 1	do	Portland, Oreg.
Van Frank	175	100 0	34 0	6 0	do	Little Rock.
Vulcan		80 0	30 0	8 0	do	Rock Island.
Wabash	140	80 0	26 0	6 9	do	Louisville.
Wallowa	229	125 0	25 6	5 0	do	Portland, Oreg.
Wolf		80 0	28 0	4 6	do	Memphis.
Wolfe, L. C.[c]		60 6	32 6	4 7	do	Wheeling.
No. 1[c]	242	90 0	30 0	7 0	do	Charleston.
No. 1[c]	348	79 10	30 0	7 4	do	Chicago.
No. 1	140	80 0	30 0	6 9	do	Cincinnati.
No. 1	150	78 6	31 4	7 2	do	Milwaukee.
No. 1	110	75 0	26 4	5 6	do	Montgomery.
No. 1		85 0	32 0	6 9	do	Pittsburg.
No. 1	221	78 0	34 0	5 6	do	Portland, Oreg.
No. 2[c]	384	79 10	30 0	7 8	do	Chicago.
No. 2	75	72 0	19 0	5 5	do	Cincinnati.
No. 2	110	75 0	26 4	5 6	do	Montgomery.
No. 2		86 6	30 0	5 0	do	Pittsburg.
No. 2	200	80 0	30 0	5 0	do	Portland, Oreg.
No. 3	110	75 0	26 4	5 6	do	Montgomery.
No. 4	112	90 0	32 0	7 0	do	Milwaukee.
No. 5[c]	160	100 0	30 0	6 0	do	Do.
No. 5[c]	100	70 0	30 0	4 9	do	Montgomery.
No. 6	90	90 0	24 0	5 0	Wood and steel.	Mobile.
No. 19[b]	100	76 0	25 0	6 0	Wood	Do.
No. 25[d]		80 0	29 0	5 0	do	Montgomery.
No. 319		70 0	26 0	4 0	do	Rock Island.
No name	147	75 0	31 0	6 0	do	Milwaukee.

CLASS D.—SNAG BOATS.

Apex	66	80 0	24 0	3 0	Wood	Nashville.
Arkansas	196	140 0	30 0	4 6	Steel	Little Rock.
Black Warrior	200	152 0	32 0	4 0	Wood	Mobile.
Chattahoochee	190	140 0	29 0	4 0	do	Montgomery.
Choctawhatchee	60	90 0	24 0	3 6	do	Do.
Columbia	75	121 0	26 0	3 3	do	Vicksburg.
Culberson, C. A	230	125 0	28 8	5 0	do	Dallas.
Demopolis	50	82 0	25 0	4 0	do	Mobile.
Escambia	60	90 0	24 0	3 6	do	Montgomery.
Flint	102	95 0	24 0	4 0	do	Do.
Florence, Thos. B	60	96 0	20 0	4 0	Iron and steel.	Vicksburg.
Howell, C. W	275	146 0	36 0	5 0	do	Do.
Humphreys, Ben[b]	214	137 0	32 0	5 0	do	Do.
Johnson, A. B	58	84 0	22 0	3 0	Wood	Little Rock.
Macomb, J. N	733	177 8	62 0	8 0	Steel	St. Louis.
Mammoth Cave[b]	200	124 0	32 0	5 0	do	Louisville.
Mandan	150	138 0	24 0	4 7	do	Kansas City.

[a] Ladder dredge.
[b] Combination.
[c] Bucket dredge.
[d] Barge fitted temporarily with dredging outfit.

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TABLE IV.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department*—Continued.

CLASS D.—SNAG BOATS—Continued.

Name, number, or letter.	Tonnage.	Dimensions.			Material.	District.
		Length.	Breadth.	Depth.		
		Ft. in.	*Ft. in.*	*Ft. in.*		
Mathloma	376	140 0	34 0	5 0	Wood	Portland, Oreg.
McCalla, R. C.	98	100 0	28 0	5 0	...do	Mobile.
McPherson, James B.	340	170 0	36 0	5 7	Steel	Kansas City.
Missouri	510	187 0	52 0	7 0	...do	Do.
Navasota	140	90 0	25 0	5 0	Wood	Dallas.
Oconee	115	110 0	24 0	4 0	...do	Savannah.
Pearl	60	82 0	26 0	5 0	...do	Mobile.
Quapaw	182	128 0	31 0	4 4	...do	Little Rock.
Ransdell, Jos. E.[a]	214	137 0	32 0	5 0	Iron and steel.	Vicksburg.
Riverside	58	84 0	22 0	3 0	Wood	Little Rock.
Roanoke[a]	124	115 0	24 0	4 10	...do	Norfolk.
Seizer	150	136 6	34 0	4 8	...do	San Francisco.
Skagit	175	114 1	31 0	4 10	...do	Seattle.
Swan[a]	154	159 0	31 4	5 0	Steel	Pittsburg.
Tackle	30	64 0	28 0	3 6	Wood	San Francisco.
Thronateeska	65	75 0	26 0	4 7	...do	Montgomery.
Tipton, David	264	160 0	33 0	5 0	...do	Rock Island.
Tombigbee	98	100 0	28 0	4 6	...do	Mobile.
Trent	70	70 0	20 0	5 0	...do	Wilmington, N. C.
Trinity[a]	260	125 0	25 0	5 0	...do	Dallas.
Tugaloo	253	129 0	34 0	5 6	...do	Savannah.
Twining, Wm. J.	210	155 0	30 0	4 0	...do	Montgomery.
Vienna	35	80 0	21 0	2 7	...do	Mobile.
Wateree	158	100 0	25 0	5 6	...do	Charleston.
Woodruff, E. A.	640	220 0	48 0	7 6	Iron, steel, and wood	Cincinnati.
Wright, Gen. H. G.	100	102 0	20 6	5 0	Wood	Wilmington, N. C.
Wright, H. G.	783	187 0	62 0	8 0	Steel	St. Louis.
No. 1	72	90 0	24 0	2 6	Wood	Nashville.

CLASS E.—TUG AND SURVEY BOATS, SCREW.

Arago	91	89 10	18 0	9 0	Wood	Portland, Oreg.
Argonauta	36	80 0	18 4	8 0	...do	Charleston.
Argus	80	84 5	15 5	9 0	Iron	New York.
Brewerton		58 4	15 7	8 11	Wood	Oswego.
Casey, Gen. T. L.	29	70 0	15 0	8 0	Steel	Buffalo.
Castle	85	95 0	19 0	10 6	...do	New London.
Caswell, Richard	60	84 10	18 6	10 0	...do	Wilmington, N. C.
Cerebus	206	100 0	22 0	12 6	...do	New York.
Chickasaw	131	108 0	18 0	8 0	...do	Mobile.
Chipeta	44	66 0	14 0	8 1	Wood	Washington, D. C.
Circle	10	46 5	13 11	6 7	...do	Duluth.
Coquet	42	58 0	18 6	7 0	...do	Wilmington, N. C.
Cora	199	140 0	23 0	12 0	...do	Newport.
Cynthia	29	74 7	17 2	7 6	...do	Wilmington, N. C.
Donovan, C.	134	98 0	19 0	8 4	Steel	New Orleans.
Engineer	157	106 0	20 0	11 0	...do	Manila.
Engineer	75	91 0	18 0	7 6	Wood	New York.
Essayons	130	85 0	21 0	11 6	Steel	Duluth.
Frolic	44	68 8	16 9	5 0	Wood	Guantanamo.
Gillmore, Gen.	27	61 6	15 0	4 10	Iron and wood.	Grand Rapids.
Harwood, Col.	59	75 2	17 2	9 7	Wood	Boston.
Humphreys, Gen. A. A.	50	71 6	16 0	7 0	...do	Philadelphia.
Impatient	39	75 0	12 6	6 6	...do	New York.
Industry	24	62 6	16 0	8 6	...do	Milwaukee.
Lamont	206	100 0	22 0	12 6	Steel	New York.
Lusk, Col. J. L.	169	124 6	19 4	9 8	Wood	Detroit.
Maguire, Capt.	49	67 0	17 7	2 6	...do	Jacksonville.
Manchac	57	76 0	16 0	7 0	...do	New Orleans.
Manisees	157	102 0	22 0	9 0	...do	New York.
Manitowoc	190	100 0	20 0	10 6	Steel	Milwaukee.
Marengo	74	73 4	18 2	8 8	...do	New Orleans.
McGregor	53	79 6	14 7	7 1	Wood	Norfolk.
Mendell	94	91 0	18 3	8 4	...do	Portland, Oreg.
Morganza	79	84 0	19 0	8 8	Steel	New Orleans.
Nimrod	103	100 0	21 0	9 0	Wood	New York.
Noble, Alfred	34	67 6	15 6	7 1	Steel	Detroit.
Parker	24	65 0	16 4	7 2	Wood	Vicksburg.
Philadelphia	55	67 0	16 0	7 6	Steel	Philadelphia.
Pontonier		80 0	18 0	3 6	...do	Washington, D. C.
Quest		65 0	15 0	8 0	Wood	Cleveland.

[a] Combination.

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TABLE IV.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department*—Continued.

CLASS E.—TUG AND SURVEY BOATS, SCREW—Continued.

Name, number, or letter.	Tonnage.	Dimensions.			Material.	District.
		Length.	Breadth.	Depth.		
		Ft. in.	*Ft. in.*	*Ft. in.*		
Rumsey, James	125	120 0	22 0	4 3	Steel	Wheeling.
San Pedro	113	92 10	20 10	10 6	...do	Manila.
Scout	150	96 0	20 0	11 5	...do	New York.
Search	140	133 0	17 0	10 0	...do	Detroit.
Sentinel	77	90 6	19 0	9 6	...do	Baltimore.
Spear	.....	85 0	20 0	10 0	Wood	Cleveland.
Surveyor	190	86 9	20 1	8 5	...do	Detroit.
Talfor, Capt	43	77 0	16 2	8 0	...do	Galveston.
Tonty	55	96 1	16 0	5 6	Steel	New Orleans.
Tunica	77	85 0	19 0	9 8	...do	Do.
Tuscaloosa	71	89 0	21 8	7 3	Wood	Mobile.
Uacha	33	61 0	14 0	7 6	Iron	New Orleans.
Vidette	34	90 0	14 9	10 0	Wood	Duluth.
Vidette	99	99 1	21 0	10 0	Steel	Philadelphia.
Vigilant	208	112 5	22 0	12 0	...do	New York.
West Neebish	11	53 3	15 1	8 2	Wood	Detroit.
Wilson	106	94 0	19 6	11 0	Steel	Seattle.
No. 1, U. S. L. S	24	69 0	13 6	4 5	Wood	Detroit.
No. 2, U. S. L. S	44	60 6	14 6	7 6	...do	Do.

CLASS F.—TOW AND SURVEY BOATS, PADDLE.

Ada	15	68 0	11 0	3 0	Wood	Rock Island.
Alabama	172	134 5	26 4	4 0	...do	Montgomery.
Alert	100	115 0	19 6	3 10	...do	Rock Island.
Alexander, Gen	110	77 6	18 0	8 0	...do	San Francisco.
Allen, A. D	86	125 0	23 0	4 5	...do	Little Rock.
Arethusa	45	91 0	18 4	4 8	...do	Kansas City.
Atalanta	45	91 0	18 4	4 8	...do	Do.
Bosse, Henry	100	100 0	19 6	3 10	...do	Rock Island.
Casey, Gen. T. L	125	143 0	28 0	4 0	...do	St. Louis.
Cherokee	125	124 6	27 5	4 0	Wood and iron.	Louisville.
Chilhowee	.....	100 0	20 0	3 0	Wood	Chattanooga.
Chisca	260	160 0	30 0	6 0	...do	Memphis.
Choctaw	338	171 6	36 0	5 6	Steel	St. Louis.
Cleveland	90	110 0	20 0	3 9	Wood	Little Rock.
Coal Bluff	175	128 0	25 0	4 6	...do	Rock Island.
Colbert	125	140 0	25 0	4 6	...do	Chattanooga.
Columbus	170	134 0	26 0	4 0	...do	Montgomery.
Control	99	136 0	29 0	4 0	...do	Vicksburg.
Coppee, H. St. L	246	140 0	30 0	6 0	Steel	Do.
Cumberland	90	130 0	24 0	4 0	Wood	Nashville.
Elinor	175	125 0	25 0	4 0	...do	Rock Island.
Elsie	15	67 0	13 0	3 0	Steel	Do.
Emerald	15	65 0	14 0	2 2	Wood	Louisville.
Emily	15	67 0	12 0	3 0	...do	Rock Island.
Fox	100	106 0	30 0	5 0	...do	Milwaukee.
Fox	42	69 2	12 3	3 0	...do	Chicago.
Fury	100	113 0	22 0	3 10	...do	Do.
Grace	35	79 0	17 0	3 3	...do	Do.
Graham	103	118 0	21 0	3 0	...do	Memphis.
Gregory	163	134 0	24 10	4 0	...do	Cincinnati.
Henry	40	86 0	18 0	2 6	...do	Nashville.
Hider, Arthur	246	140 0	30 0	6 0	Steel	Vicksburg.
Hiwassee	.....	100 0	20 0	3 0	Wood	Chattanooga.
Hyacinth	.....	89 0	18 0	2 6	...do	New Orleans.
Itasca	45	76 0	15 0	5 0	Iron	Memphis.
John	40	86 0	18 0	2 6	Wood	Nashville.
Kentucky	244	148 0	34 0	5 6	...do	Cincinnati.
King, Col. W. R	25	65 0	16 0	3 6	...do	Chattanooga.
King, W. R	400	190 0	41 0	5 0	Steel	St. Louis.
Leota	58	120 0	20 0	4 10	Wood	Montgomery.
Leota	338	171 6	36 0	5 6	Steel	St. Louis.
Little Ben	5	45 0	11 0	1 6	Wood	Nashville.
Loma	31	83 0	15 7	4 7	...do	Wheeling.
Lookout	100	110 0	25 0	4 0	...do	Chattanooga.
Louise	15	61 0	12 0	3 0	Steel	Rock Island.
Lucia	15	68 0	12 8	3 0	Wood	Do.
Mac	35	73 0	16 0	3 0	...do	Do.
Marion	54	80 0	18 0	3 8	...do	Chicago.
Mars	50	80 0	17 0	3 9	Steel	St. Louis.
McPherson	79	125 0	20 0	2 6	Wood	Chattanooga.
Mercury	50	80 0	17 0	3 9	Steel	St. Louis.
Merrill	125	115 0	22 0	3 6	Wood	Cincinnati.

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TABLE IV.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department*—Continued.

CLASS F.—TOW AND SURVEY BOATS, PADDLE—Continued.

Name, number, or letter.	Tonnage.	Dimensions.			Material.	District.
		Length.	Breadth.	Depth.		
		Ft. in.	*Ft. in.*	*Ft. in.*		
Minnetonka	382	176 5	29 9	5 4	Wood	Memphis.
Mississippi	390	174 0	32 0	6 0	Steel	St. Louis.
Newton, Gen. J.	221	149 0	24 0	7 6	...do	New Orleans.
Nokomis	338	171 6	36 0	5 6	...do	St. Louis.
Nugent	97	120 0	24 0	3 6	Wood	Mobile.
Ogama	106	112 6	23 3	4 0	...do	St. Paul.
Osage	14	60 0	14 0	2 7	...do	Kansas City.
Patrol	163	130 8	28 0	4 9	...do	St. Louis.
Pearl	54	85 1	18 0	4 1	...do	Chicago.
Ramos	71	100 0	22 6	3 1	...do	New Orleans.
Rees, W. M	.....	81 0	12 0	4 0	...do	Memphis.
Roberts, T. P	80	115 0	22 8	4 0	...do	Pittsburg.
Ruth	35	75 0	17 0	3 3	...do	Rock Island.
Sachem	338	171 6	36 0	5 6	Steel	St. Louis.
Search	149	120 6	22 3	4 0	Wood	Do.
Shawnee	83	119 0	25 0	3 6	...do	Louisville.
Simpson, Gen. J. H	280	170 0	32 0	5 0	...do	St. Louis.
Slackwater	98	120 0	26 4	4 3	...do	Pittsburg.
Sylph	26	72 0	16 0	2 9	...do	Mobile.
Tensas	78	93 6	20 4	2 0	Steel	New Orleans.
Titan	210	142 0	27 0	6 0	Wood	Memphis.
Tom Ray	9	60 0	18 0	1 6	...do	Nashville.
Vega	90	104 0	17 4	4 0	...do	Cincinnati.
Venus	50	80 0	17 0	3 9	Steel	St. Louis.
Vulcan	50	80 0	17 0	3 9	...do	Do.
Wave Rock	15	47 0	14 0	2 1	Wood	Louisville.
White Oak	35	90 0	18 0	3 0	...do	Chattanooga.
Wolf	80	89 0	30 0	4 6	...do	Milwaukee.
Wynoka	338	171 6	36 0	5 6	Steel	St. Louis.
No. 3	37	81 0	18 0	3 3	Wood	Do.
No. 4	37	81 0	18 0	3 3	...do	Do.
No. 5	37	81 0	18 0	3 3	...do	Do.
No. 6	16	55 0	13 0	3 2	...do	Do.
No. 7	16	55 0	13 0	3 2	...do	Do.
No. 8	100	100 0	24 0	4 3	Steel	Do.
No. 9	100	100 0	24 0	4 3	...do	Do.
No. 10	100	100 0	24 0	4 3	...do	Do.
No name	63	73 0	15 0	3 6	Wood	Charleston.

CLASS G.—STEAM LIGHTERS.

Executive	150	91 0	20 0	8 5	Wood	Boston.
Pioneer	200	90 0	28 0	7 6	...do	Guantanamo.
Panuco	192	106 5	28 0	8 0	...do	New London.
Socastee	23	41 0	12 0	4 0	...do	Charleston.

CLASS H.—LAUNCHES.

Albatross	1	30 0	5 10	2 6	Wood	Pittsburg.
Amelia	6	35 0	8 0	4 0	...do	Savannah.
Angler	112	85 6	16 0	10 6	...do	Do.
Arc	.....	16 0	4 6	3 0	...do	Duluth.
Ariadne	8	40 0	9 0	4 8	...do	Milwaukee.
Ariel	6	36 0	7 6	5 0	...do	Cleveland.
Arrow	.....	31 0	7 0	4 0	...do	Montgomery.
Bar	2	27 0	7 0	3 0	...do	Galveston.
Bastrop	16	46 6	11 3	5 0	...do	Do.
Beatrice	.....	30 0	6 6	3 2	...do	New Orleans.
Beetle	.....	26 0	5 1	1 5	...do	Chicago.
Bertha S	3.5	33 0	6 6	2 0	...do	Grand Rapids.
Biloxi	3.19	40 0	11 0	4 7	...do	Mobile.
Brazos	15	50 0	14 0	2 2	...do	Dallas.
Calumet	2	22 0	5 0	1 4	...do	Chicago.
Carolina	28	82 0	12 6	5 0	...do	Charleston.
Catoma	.....	25 0	7 3	2 4	...do	Montgomery.
C. B. C	2	20 4	6 0	3 0	...do	Galveston.
Chord	.....	22 6	5 6	3 6	...do	Duluth.
Cobra	.....	26 0	5 3	1 3	...do	Rock Island.
Cosine	3	26 0	7 2	2 6	...do	Savannah.
Curve	.....	22 6	5 6	2 6	...do	Duluth.
Davy	.....	24 8	5 3	1 8	...do	Rock Island.
Dearborn	9	50 0	8 6	3 2	Steel	Chicago.
Delaware	2	20 2	6 8	3 2	Wood	Philadelphia.

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TABLE IV.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department*—Continued.

CLASS H.—LAUNCHES—Continued.

Name, number, or letter.	Tonnage.	Dimensions.			Material.	District.
		Length.	Breadth.	Depth.		
		Ft. in.	*Ft. in.*	*Ft. in.*		
Dispatch		23 0	4 6	1 10	Wood	Rock Island.
Do	2	21 0	5 4	2 7	do	Vicksburg.
Dolly	1	25 0	6 0	2 0	do	Portland, Oreg.
Do		26 0	5 3	1 3	do	Rock Island.
Don		41 9	9 7	3 6	do	Detroit.
Dorothy	1.5	22 2	6 11	1 4	do	Philadelphia
Dunkirk		24 6	6 8	3 0	do	Buffalo.
E. A. W	21	30 0	9 6	2 6	Steel	Cincinnati.
Engineer	5.33	37 6	7 8	3 0	Wood	Grand Rapids.
Do		30 0	6 6	2 8	do	Washington.
Engineer, U. S	3.04	30 0	6 5	3 1	do	Newport.
Enlf	7	30 0	7 6	4 6	do	Jacksonville.
Enquirer		30 4	7 0	3 0	do	Kansas City.
Eufaula		25 0	7 3	2 4	do	Grand Rapids.
Firefly		26 0	5 1	1 5	do	Chicago.
Folly		26 0	5 3	1 3	do	Rock Island.
Frances	4	33 0	7 0	3 0	do	Wilmington, N. C.
Freak	5	27 0	8 0	3 3	do	Jacksonville.
"G"		25 0	8 0	3 0	do	Galveston.
Gem	4	40 0	8 0	3 0	do	Savannah.
Gnat		26 0	5 1	1 5	do	Chicago.
Gwendolen	4	31 0	8 0	4 6	do	Buffalo.
Helen	33	56 0	12 4	6 0	do	Galveston.
Hill	6.9	30 9	7 7	2 6	do	Do.
Hinda		28 0	7 6	2 3	do	Wilmington, Del.
Holly		26 0	5 3	1 3	do	Rock Island.
Hornet		26 0	5 3	1 3	do	Do.
Hospital Point		15 6	4 0	2 0	do	Norfolk.
Ingalls, Gen	8	43 0	8 2	4 8	do	New York.
Ino	.5	20 0	4 3	1 6	do	Dallas.
Inspector		34 0	7 0	4 6	do	Cleveland.
Do	12	50 0	8 9	4 8	Steel	Milwaukee.
Jennie	5	30 0	8 0	3 2	Wood	Portland, Oreg.
Jolly		26 0	5 3	1 3	do	Rock Island.
Jordan	3	32 0	11 0	2 6	do	Mobile.
Katherine	6	25 0	5 11	3 2	do	Guantanamo.
Do		30 6	7 6		do	New London.
Lake Drummond		24 2	6 5	2 7	do	Norfolk.
Lark		26 0	5 3	1 3	do	Rock Island.
Leaf	3	32 0	11 0	2 6	do	Mobile.
Linnet		26 0	5 3	1 3	do	Rock Island.
Locust		26 0	5 1	1 5	do	Chicago.
Lookout	1	26 0	4 0	2 6	do	New York.
Loon		26 0	6 0	1 6	do	Chicago.
Louise	9	40 0	10 0	5 0	do	Charleston.
Ludington	1.47	22 0	5 0	2 3	do	Grand Rapids.
Lunette	3	20 0	5 6	3 6	do	Jacksonville.
Luzon	4	53 0	9 4	4 6	do	Pittsburg.
Mac	3.5	27 0	6 0	3 0	do	Jacksonville.
Madge	4	25 0	6 0	3 0	do	Rock Island.
Mamie K	3.25	25 0	6 0	2 7	do	Mobile.
Margaretta		21 0	5 6	2 6	do	Portland, Oreg.
Marie		29 0	8 0	4 0	do	New York.
Mary Mc	12	43 0	8 0	4 0	do	Chicago.
Mascot	7	61 0	8 0	3 7	Steel	Wheeling.
M. C		16 0	4 0	1 10	Wood	Chicago.
McPherson		20 0	5 0	2 3	Steel	Kansas City.
Mercur	28	83 0	13 3	7 0	do	Wilmington, N. C.
Messenger	1.33	17 7	5 6	2 4	Wood	Grand Rapids.
Missouri		24 8	5 6	2 5	Steel	Kansas City.
Molly		26 0	5 3	1 3	Wood	Rock Island.
Mosquito		26 0	5 1	1 5	do	Chicago.
Moth		26 0	5 1	1 5	do	Do.
Myra	10	40 0	7 4	3 6	do	Rock Island.
Nancy	3.5	30 0	6 5	2 0	do	Wilmington, N. C.
Nell	1.5	25 0	5 6	2 3	do	Cincinnati.
Norka		67 0	14 0	6 1	do	Portland, Me.
Olive	3.5	30 2	6 2	2 0	do	Wilmington, N. C.
Ontario		27 0	6 0	3 0	do	Oswego.
Ouachita	9	65 5	10 5	3 2	Steel	Vicksburg.
Pathfinder	9	38 0	8 0	3 0	Wood	Baltimore.
Pearl	5	40 0	7 6	4 0	do	Cincinnati.
Pedrito	8	30 0	7 0	3 4	do	Los Angeles.
Pigmy	45	54 0	2 2	3 8	do	Galveston.
Pioneer	4	35 0	8 6	4 0	do	Cincinnati.
Plebe	11	56 0	9 0	5 0	do	Boston.
Polly		26 0	5 3	1 3	do	Rock Island.

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TABLE IV.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department*—Continued.

CLASS H.—LAUNCHES—Continued.

Name, number, or letter.	Tonnage.	Dimensions.			Material.	District.
		Length.	Breadth.	Depth.		
		Ft. in.	*Ft. in.*	*Ft. in.*		
Polly	1	16 0	14 6	2 6	Wood	Wilmington, N. C.
Radius	1	18 0	5 0	1 6	...do	Savannah.
Rock Island Rapids	4	22 0	4 0	2 0	...do	Rock Island.
Sally		26 0	5 3	1 3	...do	Do.
Santa Rosa	40	70 0	18 8	9 6	...do	Montgomery.
Schuylkill	16	54 0	12 0	3 6	...do	Philadelphia.
Schuyler		25 0	5 8	1 10	...do	New York.
Scorpion	1.5	23 0	7 0	4 0	...do	Philadelphia.
Sextant		30 0	6 6	2 6	...do	Dallas.
Sharpie	7	48 0	8 6	4 0	...do	Charleston.
Sheppard, Morris	5	35 0	7 6	3 0	...do	Dallas.
Snipe		20 0	6 4	2 0	...do	Chicago.
Sparrow		20 0	5 10	1 7	...do	Rock Island.
Spray	10	45 0	11 0	4 0	...do	Savannah.
Stadia		30 0	6 6	2 0	...do	New Orleans.
Swallow		20 0	5 10	1 7	...do	Rock Island.
Swift		20 0	5 10	1 7	...do	Do.
Tangent	8	41 0	8 0	4 7	...do	Duluth.
Thom, Gen. Geo	24	73 0	12 5	4 6	...do	Wilmington.
Titania		27 0	4 0	2 0	...do	Memphis.
Transit		30 0	6 6	2 5	...do	Dallas.
Trumbull, G. A	2	21 0	5 0	2 0	...do	Do.
Vamos	5	31 0	7 0	2 2	...do	Rock Island.
Victoria	3	27 0	6 0	3 0	...do	Galveston.
Vigilant	22	65 11	11 6	4 0	...do	Seattle.
Violetta	8	31 0	11 4	4 4	...do	Jacksonville.
Viper		28 0	4 6	2 6	...do	Chicago.
Warren, Gen	38.19	72 2	17 0	5 0	...do	Washington.
Wasp		22 0	5 0	0 8	...do	Rock Island.
Wenonah	10	65 0	8 0	5 0	...do	Pittsburg.
Winyaw	4	30 0	6 0	3 6	...do	Charleston.
Wolf	4	36 5	9 5	2 5	...do	Mobile.
Wren		26 0	5 3	1 3	...do	Rock Island.
No. 1	1	25 0	5 6	4 0	...do	Detroit.
No. 1	8	35 0	9 0	3 9	...do	Milwaukee.
No. 1	22	75 0	15 0	2 6	...do	Nashville.
No. 1, Burton		16 0	4 6	3 0	...do	Cleveland.
No. 1, Hancock		15 6	4 6	2 6	...do	Detroit.
No. 2	2	20 0	5 3	2 6	Steel	Chattanooga.
No. 2	10	40 0	10 0	4 4	Wood	Milwaukee.
No. 3		22 0	6 0	2 4	...do	Chattanooga.
No. 3	8	35 0	9 0	3 9	...do	Milwaukee.
No. 3, U. S. L. S		22 0	6 0	3 0	...do	Detroit.
No. 4		22 0	6 0	2 4	...do	Chattanooga.
No. 4, U. S. L. S		36 0	9 10	4 6	...do	Detroit.
No. 5		19 2	4 3	2 7	...do	Chattanooga.
No. 5, U. S. L. S		36 0	8 8	4 0	...do	Detroit.
No. 6		24 0	6 0	3 6	...do	Chattanooga.
No. 6, U. S. L. S		36 0	8 8	4 0	...do	Detroit.
No. 7		28 0	4 0	3 0	...do	Chattanooga.
No name	3	25 0	4 6	2 6	Steel	Little Rock.
No name	3	25 0	8 6	3 3	Wood	Portland, Oreg.
No name	10	30 3	7 10	4 0	...do	Do.
No name		28 0	6 6	3 0	Steel	St. Louis.
No name		28 0	6 6	3 0	...do	Do.
No name	7	30 0	7 6	3 1	Wood	Washington.

CLASS I—MANEUVER BOATS.

No. 1, Catlettsburg	41.6	50 0	20 0	3 4	Wood	Cincinnati.
No. 1, Kavanaugh	41.6	50 0	20 0	3 4	...do	Do.
No. 2, Louisa	69.2	60 0	26 0	3 4	...do	Do.
No. 10, U. S. E. Wheeling		60 0	22 0	3 8	...do	Wheeling.
No. 11, U. S. E. Wheeling		60 0	22 0	3 8	...do	Do.
No name		53 8	16 0	3 0	Steel	Pittsburg.
No name		56 0	18 0	3 3	Wood	Do.
No name		56 0	18 0	3 3	...do	Do.
No name		60 0	22 0	3 8	...do	Do.
No name		60 0	22 0	3 8	...do	Do.
No name		60 0	22 0	3 8	...do	Do.
No name		60 0	22 0	3 8	...do	Do.

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TABLE V.—*Statement of floating plant owned by the United States*

BALTIMORE, MD.

Name or number.	Class and description.	Tonnage.	Dimensions.			Built.	
			Length.	Width.	Depth.	When.	Where.
			Ft. in.	*Ft. in.*	*Ft. in.*		
Sentinel	Tugboat	77.22	90 6	19 0	9 6	1897	Baltimore, Md.
Pathfinder	Gasoline boat	(b)	38 0	8 0	3 0	1909	do.

BOSTON, MASS.

Executive	Steam lighter	150.00	91 0	20 0	8 5	1901	Essex, Mass.
Colonel Harwood	Steamboat	59.00	75 2	17 2	9 7	1898	South Portland, Me.
Plebe	Gasoline motor launch (altered from cabin steam launch).	11.00	56 0	9 0	5 0	1899	Boston, Mass.
No. 1	Scow	15.00	55 0	12 0	3 2	1910	do.
No. 2	do.	15.00	55 0	12 0	3 2	1910	do.

BUFFALO, N. Y.

Thomas Lincoln Casey.	Steam tug	28.76	70 0	15 0	8 0	1898	Toledo, Ohio.
Gwendolen	Steam launch	4.00	31 0	8 0	4 6	1900	Erie, Pa.
Dunkirk	Gasoline launch		24 6	6 8	3 0	1906	Dunkirk, N. Y.
Gemini	Sounding scow		120 0	30 0	3 0	1897	Buffalo, N. Y.

CHARLESTON, S. C.

Sumter	Steam pump dredge		198 5	41 0	21 0	1904	Petersburg, Va.
Charleston	do.	517.36	122 6	30 0	12 0	1891	Brooklyn, N. Y.
Winyah Bay	do.	466.00	141 0	31 6	13 0	1898	Wilmington, Del.
Congaree	Steam suction dredge	385.00	110 0	32 0	2 6	1908	Georgetown, S. C.
Cheraw	Dipper dredge	400.00	150 0	28 0	6 0	1905	Wilmington, Del.
Dredge No. 1	Steam bucket dredge	242.00	90 0	30 0	7 0	1892	Georgetown, S. C.
Wateree	Steam hoister	158.00	100 0	25 0	5 6	1907	do.
Socastee	Lighter converted into a steam hoister.	23.00	41 0	12 0	4 0	1903	do.
Wood boat	Stern-wheel steamer	63.00	73 0	15 0	3 6	1907	do.
Argonauta	Steam tug	35.57	80 0	18 4	8 0	1875	Camden, N. J.
Carolina	Steam launch	28.00	82 0	12 6	5 0	1901	Georgetown, S. C.
Louise	Naphtha launch	9.00	40 0	10 0	5 0	1903	Mt. Pleasant, S. C.
Winyaw	Kerosene launch	4.00	30 0	6 0	3 6	1891	Morris Heights, N. Y.

[a] A new boiler was installed and the machinery of the boat overhauled.

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and employed in the Engineer Department at Large on June 30, 1910.

BALTIMORE, MD.

Purchased. When.	Purchased. Where.	Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
1897	Baltimore, Md..	Steel..	$24,497.00	$20,000.00	Good [a]	All works in district.	Improving harbor, Baltimore, Md.
1909	Built by Engineer Department employees.	Wood.	1,360.00	1,200.00	...do..	.....do.....	Do.

BOSTON, MASS.

.....	(c)	Wood.	$19,450.00	$9,000.00	Good .	Boston Harbor, Mass.	Gun and mortar batteries.
1906	Portland, Me....	...do ..	9,800.00	10,000.00	...do ..	.....do.....	Boston Harbor, Mass.
.....	(c)	...do ..	6,500.00	1,400.00	...do ..	Boston Harbor and vicinity.	Boston Harbor, one-half part; Plymouth Harbor, one-fourth; Mystic River, one-fourth.
.....	(c)	...do ..	1,349.00	1,349.00	...do ..	Boston Harbor, Mass.	Boston Harbor, Mass.
.....	(c)	...do ..	1,349.00	1,349.00	...do ..	.....do.....	Do.

BUFFALO, N. Y.

1898	Toledo, Ohio....	Steel..	$11,970.00	$7,500.00	Good .	Buffalo, N. Y.....	Improving harbor, Buffalo, N. Y.
1900	Erie, Pa.....	Wood.	1,800.00	1,200.00	...do ..	Erie, Pa.....	Improving harbor, Erie, Pa.
1906	Dunkirk, N. Y..	...do ..	200.00	200.00	...do ..	Dunkirk, N. Y....	Improving harbor, Dunkirk, N. Y.
1897	Buffalo, N. Y...	...do ..	1,800.00	1,000.00	...do ..	Buffalo, N. Y.....	Improving harbor, Buffalo, N. Y.

CHARLESTON, S. C.

.....	.....	Wood.	$191,560.00	$125,000.00	Good..	Under New Orleans office.	Improving harbor, Charleston, S. C.
.....	.....	...do...	65,000.00	40,000.00	...do...	Under Mobile, Ala., office.	Do.
.....	.....	...do...	[d] 73,800.00	40,000.00	...do...	Charleston Harbor, S. C.	Improving Winyah Bay, S. C.
.....	.....	...do...	30,200.00	20,000.00	...do...	Congaree River, S. C.	Improving Santee, Wateree, Congaree and Great Pedee rivers.
.....	.....	Steel..	45,500.00	25,000.00	Fair...	Great Pedee River. S. C.	Improving Great Pedee River, S.C.
.....	.....	Wood.	18,000.00	4,000.00	...do...	Winyah Bay, S. C.	Improving Santee River, S. C.
.....	.....	...do...	9,404.00	2,500.00	Poor..	Wateree River, S. C.	Improving Wateree River, S. C.
.....	.....	...do...	200.00	500.00	Fair...	Laid up at Smithville, S. C.	Improving Winyah Bay, S. C.
.....	.....	...do...	1,500.00	1,000.00	...do...	Great Pedee River, S. C.	Improving Great Pedee River, S.C.
1890	Philadelphia, Pa	...do...	10,000.00	3,000.00	Poor..	Winyah Bay, S. C.	Improving harbor, Charleston, S. C.
.....	.....	...do...	12,000.00	4,000.00	...do...	Laid up at Smithville.	Improving Winyah Bay, S. C.
.....	.....	...do...	3,500.00	2,500.00	Good..	Charleston, S. C...	Improving harbor, Charleston, S. C.
1891	New York, N. Y.	...do...	1,700.00	500.00	Poor..	Winyah Bay, S. C.	Improving Winyah Bay, S. C.

[b] About 9 tons net. [c] Built for United States. [d] Plus cost of outfit.

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TABLE V.—*Statement of floating plant owned by the United States and*

CHARLESTON, S. C.—Continued.

Name or number.	Class and description.	Tonnage.	Dimensions.			Built.	
			Length.	Width.	Depth.	When.	Where.
			Ft. in.	Ft. in.	Ft. in.		
Sharpie	Launch	7.00	48 0	8 6	4 0	1894	Georgetown, S. C.
2 lighters (C and D)	Side dump	56.00	40 0	15 0	6 0	1896	Smithville, S. C.
1 lighter (E)	Decked	57.50	76 0	18 0	4 0	.....	(a)
2 lighters	do	70.00	70 0	22 0	6 0	1907	Charleston, S. C.
3 lighters	do	65.00	60 0	20 0	6 0	1903	do
2 lighters	do	70.00	70 0	22 0	4 6	1904	Columbia, S. C.
2 lighters	Bottom dump	[c] 305.00	90 0	24 0	9 0	1904	Georgetown, S. C.

CHATTANOOGA, TENN.

Colbert [d]	Stern-wheel towboat	125.00	140 0	25 0	4 6	1891	Jeffersonville, Ind.
Col. W. R. King [e]	do	25.00	65 0	16 0	3 6	1896	Muscle Shoals Canal.
Lookout	do	100.00	110 0	25 0	4 0	1896	Jeffersonville, Ind.
McPherson	do	79.00	125 0	20 0	2 6	1888	Nashville, Tenn.
Chilhowee	do	.....	100 0	20 0	3 0	1908	Jeffersonville, Ind.
Hiwassee	do	.....	100 0	20 0	3 0	1908	do
White Oak	Gasoline towboat	35.00	90 0	18 0	3 0	1905	do
No. 2	Gasoline launch	2.00	20 0	5 3	2 6	.....	Not known.
No. 3	do	.....	22 0	6 0	2 4	1908	Knoxville, Tenn.
No. 4	do	.....	22 0	6 0	2 4	1908	do
No. 5 [c]	do	.....	19 2	4 3	2 7	.....	Not known.
No. 6	do	.....	24 0	6 0	3 6	1909	Muscle Shoals Canal.
No. 7	do	.....	28 0	4 0	3 0	1909	do
Kentucky [f]	Dipper dredge (nonpropelling).	.....	100 0	34 0	6 10	1900	Paducah, Ky.
Kwasind [f]	do	.....	80 0	28 0	6 6	1899	Knoxville, Tenn.
Alabama	Wet conveyor dredge (nonpropelling).	.....	80 0	38 0	6 6	1891	Bucyrus, Ohio, Mach'y; Chattanooga, Tenn., hull.
Tennessee	Dipper dredge (nonpropelling).	.....	100 0	34 0	6 10	1910	Muscle Shoals Canal (hull); South Milwaukee, Wis. (machinery).
No. 1	Quarter boat	.....	60 0	16 0	3 0	1893	Kingston, Tenn.
No. 2	do	.....	80 0	18 0	3 0	1896	do
No. 3	do	.....	60 0	16 0	3 0	1888	Chattanooga, Tenn.
No. 5	do	.....	64 0	16 0	3 0	1902	Knoxville, Tenn.
No. 6	do	.....	65 0	16 0	3 0	1902	do
No. 7	do	.....	106 0	21 0	3 0	1902	do
No. 8	do	.....	67 0	16 0	3 0	1893	Chattanooga, Tenn.
No. 9	do	.....	104 0	20 0	3 6	1907	Muscle Shoals Canal.
No. 10	do	.....	105 0	21 0	3 9	1908	do
No. 11	do	.....	100 0	20 0	4 0	1908	do
No. 12	do	.....	80 0	20 0	5 0	1897	do
No. 14	do	.....	100 0	20 0	4 0	1909	do
No. 15 [g]	do	.....	100 0	20 0	3 0	1909	do
No. 16 [h]	do	.....	100 0	20 0	3 0	1909	do
No. 17 [i]	do	.....	100 0	20 0	3 0	1909	do
No. 3	Derrick boat	.....	80 0	24 0	4 6	1904	do
No. 4	do	.....	80 0	30 0	3 0	1896	Knoxville, Tenn.
No. 5 [j]	do	.....	100 0	34 0	6 10	1908	Muscle Shoals Canal.
No. 6	do	.....	100 0	20 0	3 0	1908	Knoxville, Tenn.
No. 7	do	.....	80 0	30 0	3 6	1909	Muscle Shoals Canal.
No. 1	Tool boat	.....	65 0	16 0	3 0	1902	Knoxville, Tenn.
No. 1	Blacksmith-shop boat	.....	100 0	18 0	3 0	1908	do

[a] Sunk and abandoned; raised by Government from Waccamaw River, 1907.
[b] About.
[c] Each.
[d] Rebuilt in 1909.
[e] Rebuilt in 1905.

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employed in the Engineer Department at Large on June 30, 1910—Continued.

CHARLESTON, S. C.—Continued.

Purchased. When.	Purchased. Where.	Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
.....	.....	Wood.	$500.00	$200.00	Fair...	Intracoastal Waterway Survey.	Improving Santee River, S. C.
.....	.....	...do...	500.00	Nothing..	Useless	Laid up at Smithville, S. C.	Improving Winyah Bay, S. C.
.....	.....	...do...	[b] 500.00	300.00	Fair...	.....do.....	Improving Waccamaw River, S. C.
.....	.....	...do...	1,947.00	600.00	...do...	Charleston, S. C...	Fortification works.
.....	.....	...do...	800.00	400.00	...do...	.....do.....	Do.
.....	.....	...do...	800.00	200.00	...do...	Congaree River, S. C.	Improving Congaree River, S. C.
.....	.....	...do...	2,250.00	1,800.00	Good..	Winyah Bay, S. C.	Improving Winyah Bay, S. C.

CHATTANOOGA, TENN.

.....	.....	Wood.	$9,500.00	$10,172.00	Good..	Tennessee River..	Work of river improvement, Chattanooga district.
.....	.....	...do...	1,300.00	2,520.00	...do...	.....do.....	Do.
.....	.....	...do...	9,000.00	4,500.00	Poor..	.....do.....	Do.
.....	.....	...do...	3,300.00	4,044.00	Good..	Muscle Shoals Canal.	Do.
.....	.....	...do...	9,616.92	8,344.00	...do...	Tennessee River..	Do.
.....	.....	...do...	9,616.92	8,040.00	...do...	.....do.....	Do.
1908	Decatur, Ala....	...do...	2,500.00	3,460.00	...do...	.....do.....	Do.
1897	Detroit, Mich...	Steel..	525.00	488.00	...do...	.....do.....	Do.
.....	.....	Wood.	740.00	639.00	...do...	.....do.....	Do.
.....	.....	...do...	740.00	639.00	...do...	Hiwassee River...	Do.
1908	Decatur, Ala....	...do...	100.00	150.00	...do...	Muscle Shoals Canal.	Do.
.....	.....	...do...	833.00	750.00	...do...	Tennessee River..	Do.
.....	.....	...do...	805.00	725.00	...do...	.....do.....	Do.
.....	.....	...do...	34,300.00	30,370.00	...do...	.....do.....	Do.
.....	.....	...do...	11,000.00	12,000.00	...do...	.....do.....	Do.
.....	.....	...do...	22,500.00	10,880.00	...do...	Muscle Shoals Canal.	Do.
.....	.....	...do...	37,513.00	37,513.00	...do...	Tennessee River..	Do.
.....	.....	...do...	1,000.00	340.00	Poor..	.....do.....	Do.
.....	.....	...do...	800.00	485.00	Fair...	Hiwassee River...	Do.
.....	.....	...do...	700.00	250.00	...do...	.....do.....	Do.
.....	.....	...do...	935.00	400.00	...do...	Muscle Shoals Canal.	Do.
.....	.....	...do...	935.00	390.00	...do...	Tennessee River..	Do.
.....	.....	...do...	1,800.00	720.00	...do...	.....do.....	Do.
.....	.....	...do...	850.00	400.00	...do...	.....do.....	Do.
.....	.....	...do...	2,437.00	1,600.00	Good..	.....do.....	Do.
.....	.....	...do...	3,257.00	2,420.00	...do...	.....do.....	Do.
.....	.....	...do...	2,800.00	2,240.00	...do...	.....do.....	Do.
.....	.....	...do...	1,000.00	100.00	Poor..	.....do.....	Do.
.....	.....	...do...	3,279.00	2,575.00	Good .	.....do.....	Do.
.....	.....	...do...	1,785.00	350.00	Poor..	.....do.....	Do.
.....	.....	...do...	1,785.00	350.00	...do...	.....do.....	Do.
.....	.....	...do...	1,785.00	400.00	...do...	.....do.....	Do.
.....	.....	...do...	2,450.00	1,360.00	Good .	Muscle Shoals Canal.	Do
.....	.....	...do...	3,325.00	1,625.00	Fair...	Tennessee River..	Do.
.....	.....	...do...	3,946.00	2,800.00	...do...	.....do.....	Do.
.....	.....	...do...	3,624.00	2,925.00	Good .	Hiwassee River...	Do.
.....	.....	...do...	5,407.00	5,000.00	...do...	Tennessee River..	Do.
.....	.....	...do...	660.00	440.00	Fair...	.....do.....	Do.
.....	.....	...do...	1,341.00	1,075.00	Good .	.....do.....	Do.

[f] Rebuilt in 1908.
[g] Hull built in 1899 (Barge No. 1).
[h] Hull built in 1899 (Barge No. 2).
[i] Hull built in 1899 (Barge No. 4).
[j] Converted hull of old dredge Kentucky, built 1899.

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TABLE V.—*Statement of floating plant owned by the United States and*

CHATTANOOGA, TENN.—Continued.

Name or number.	Class and description.	Tonnage.	Dimensions. Length.	Width.	Depth.	Built. When.	Where.
			Ft. in.	*Ft. in.*	*Ft. in.*		
No. 1	Drill tender		65 0	16 0	3 0	1902	Knoxville, Tenn.
Nos. 14, 16, 17	Barges		65 0	16 0	3 0	1902	do.
No. 15	Barge		65 0	16 0	3 0	1902	do.
Nos. 18, 19, 20	Barges		65 0	18 0	3 0	1903	do.
No. 21	Barge		100 0	24 0	4 8	1905	Muscle Shoals Canal.
No. 22	do		100 0	24 0	4 8	1905	do.
No. 23	do		140 0	30 0	4 6		
Nos. 24, 25, 26	Barges		100 0	24 0	4 8	1908	Muscle Shoals Canal.
Nos. 27, 28	do		100 0	20 0	3 0	1908	Knoxville, Tenn.
No. 30	Barge		100 0	20 0	3 0	1908	do.
No. 31	do		50 0	24 0	5 6	1908	Muscle Shoals Canal.
No. 32	do		120 0	24 0	6 0	1908	do.
No. 33	do		120 0	24 0	6 0	1908	do.
No. 34	do		120 0	24 0	6 0	1908	do.
No. 37	do		70 0	16 0	3 6	1908	do.
No. 38	do		24 0	10 0	1 6	1908	do.
No. 39	do		120 0	24 0	6 0	1909	do.
No. 40	do		50 0	24 0	5 0	1910	do.
No. 1	Dump scow		73 0	20 0	7 0	1899	Chattanooga, Tenn.
No. 2	do		73 0	20 0	7 0	1899	do.
No. 3	do		73 0	20 0	7 11	1899	do.
No. 4	do		80 0	20 0	5 0	1909	Muscle Shoals Canal.
No. 5	do		73 0	20 0	6 0	1909	do.
No. 6	do		73 0	20 0	6 0	1909	do.
No. 7	do		73 0	20 0	6 0	1910	do.
Unnumbered	Cabin boat		24 0	10 0		1907	Kingsport, Tenn.
Do	do		24 0	12 0		1907	do.
Do	do		36 0	12 0		1907	Clinton, Tenn.
Unnumbered (two)	Flatboats		24 0	10 0		1907	do.

CHICAGO, ILL., FIRST DISTRICT.

Dearborn	Steam launch	9.00	50 0	8 6	3 2	1902	Racine, Wis.
Calumet[a]	Gasoline launch	2.00	22 0	5 0	1 4	1905	do.
No. 1	Pontoon	10.00	28 0	8 0	2 6	1907	Chicago, Ill.
M. C.	Power skiff		16 0	4 0	1 10	1909	Michigan City, Ind.

CHICAGO, ILL., SECOND DISTRICT.

Marion	Stern-wheel steamboat (used as towboat).	54.00	80 0	18 0	38 0	1895	Keokuk, Iowa.
Mary Mc	Gasoline launch	12.00	43 0	8 0	4 0	1900	La Crosse, Wis.
Rambler	Houseboat	8.00	48 0	15 0	3 0	1902	Clinton, Iowa.
Snipe	Power skiff		20 0	6 4	2 0	1908	Keokuk, Iowa.
Loon	do		26 0	6 0	1 6	1908	do.
Beetle	do		26 0	5 1	1 5	1909	do.
Firefly	do		26 0	5 1	1 5	1909	do.
Gnat	do		26 0	5 1	1 5	1909	do.
Locust	do		26 0	5 1	1 5	1909	do.
Mosquito	do		26 0	5 1	1 5	1909	do.
Moth	do		26 0	5 1	1 5	1909	do.
Viper	do		28 0	4 6	2 6	1909	do.
Pearl	Towboat	54.00	85 1	18 0	4 1	1897 1909	do. Rebuilt, Beardstown.
Fox	do	42.00	69 2	12 0	3 0	1897	Keokuk, Iowa.
No. 1	Deck barge	80.00	68 0	16 0	3 8	1908	Rock Falls, Ill.
No. 2	do	80.00	68 0	16 0	3 8	1908	do.

[a] Formerly "Libbie H."

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employed in the Engineer Department at Large on June 30, 1910—Continued.

CHATTANOOGA, TENN.—Continued.

Purchased. When.	Purchased. Where.	Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
.....	.....	Wood.	$600.00	$400.00	Fair...	Tennessee River..	Work of river improvement, Chattanooga district.
.....	.....	...do...	1,650.00	760.00	...do...	Hiwassee River...	Do.
.....	.....	...do...	550.00	100.00	Poor..	Tennessee River..	Do.
.....	.....	...do...	1,800.00	1,050.00	Fair...	.....do.....	Do.
.....	.....	...do...	1,600.00	1,125.00	Good .	Muscle Shoals Canal.	Do.
.....	.....	...do...	1,600.00	1,180.00	...do...	Tennessee River..	Do.
1907	Rockwood, Tenn	...do...	1,800.00	1,260.00	Fair...	.....do.....	Do.
.....	.....	...do...	6,300.00	4,800.00	Good .	.....do.....	Do.
.....	.....	...do...	2,250.00	1,625.00	...do...	.....do.....	Do.
.....	.....	...do...	1,287.00	1.000.00	...do...	.....do.....	Do.
.....	.....	...do...	1,171.00	940.00	...do...	.....do.....	Do.
.....	.....	...do...	2,756.00	2,200.00	...do...	.....do.....	Do.
.....	.....	...do...	2,756.00	2,205.00	...do...	.....do.....	Do.
.....	.....	...do...	2,800.00	2,000.00	...do...	.....do.....	Do.
.....	.....	...do...	950.00	770.00	...do...	Muscle Shoals Canal.	Do.
.....	.....	...do ..	172.00	50.00	Poor..	.....do.....	Do.
.....	.....	...do...	3,276.00	2,625.00	Good..	Tennessee River..	Do.
.....	.....	...do...	1,352.00	1,352.00	...do...	.....do.....	Do.
.....	.....	...do...	1,926.00	750.00	Poor..	.....do.....	Do.
.....	.....	...do...	1,926.00	750.00	...do...	.....do.....	Do.
.....	.....	...do...	1,926.00	.....	Worthless.	.....do.....	Do.
.....	.....	...do...	3,000.00	2,450.00	Good..	.....do.....	Do.
.....	.....	...do...	2,665.00	2,200.00	...do...	.....do.....	Do.
.....	.....	...do...	2,665.00	2,200.00	...do...	.....do.....	Do.
.....	.....	...do...	2,216.00	2,216.00	...do...	.....do.....	Do.
.....	.....	...do...	45.00	.....	Worthless.	.....do.....	Do.
.....	.....	...do...	55.00	.....	...do...	.....do.....	Do.
.....	.....	...do...	89.00	.....	...do...	.....do.....	Do.
.....	.....	...do...	110.00	.....	...do...	.....do.....	Do.

CHICAGO, ILL., FIRST DISTRICT.

1902	Racine, Wis.....	Steel..	$5,000.00	$2,700.00	Good..	Chicago and Calumet rivers and harbors.	Improving Chicago River, Ill.
1906	Three Lakes, Wis.	Wood.	400.00	275.00	Fair...	Calumet River and Harbor.	Improving Calumet River, Ill. and Ind.
1908	Chicago, Ill.....	...do...	200.00	250.00	Good..	Chicago River.....	Improving Chicago River, Ill.
1909	Michigan City. Ind.	...do...	100.00	100.00	...do...	Michigan City, Ind.	Improving harbor Michigan City, Ind.

CHICAGO, ILL., SECOND DISTRICT.

.....	.....	Wood.	$6,500.00	$7,000.00	Good..	Illinois and Mississippi Canal.	Illinois and Mississippi Canal.
1903	Rock Island, Ill.	...do...	1,750.00	1,200.00	...do...	.....do.....	Do.
1907	.....do.....	...do...	1,500.00	1,200.00	Fair...	.....do.....	Do.
.....	.....	...do...	200.00	200.00	Good..	.....do.....	Do.
.....	.....	...do...	200.00	200.00	...do...	.....do.....	Do..
.....	.....	...do...	300.00	300.00	...do...	.....do.....	Do.
.....	.....	...do...	300.00	300.00	...do...	.....do.....	Do.
.....	.....	...do...	300.00	300.00	...do...	.....do.....	Do.
.....	.....	...do...	300.00	300.00	...do...	.....do.....	Do.
.....	.....	...do...	300.00	300.00	...do...	.....do.....	Do.
.....	.....	...do...	300.00	300.00	...do...	.....do.....	Do.
.....	.....	...do...	800.00	800.00	...do...	.....do.....	Do.
}	.....	...do...	7,000.00	6,700.00	...do...	Illinois River, Ill..	{ Improving Illinois River, Ill.
.....	.....	...do...	4,385.00	2,000.00	Fair...	.....do.....	Do.
.....	.....	...do...	550.00	352.00	Good..	Illinois and Mississippi Canal.	Illinois and Mississippi Canal.
.....	.....	...do...	550.00	352.00	...do...	.....do.....	Do.

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TABLE V.—*Statement of floating plant owned by the United States and*

CHICAGO, ILL., SECOND DISTRICT—Continued.

Name or number.	Class and description.	Tonnage.	Dimensions. Length.	Width.	Depth.	Built. When.	Where.
			Ft. in.	*Ft. in.*	*Ft. in.*		
No. 3	Deck barge	80.00	70 0	16 0	4 0	1908	Rock Falls, Ill.
No. 4	do	80.00	70 0	16 0	4 0	1908	do.
No. 5	do	80.00	70 0	16 0	4 0	1908	do.
No. 6	do	80.00	70 0	16 0	4 0	1908	do.
No. 7	do	80.00	70 0	16 0	4 0	1908	do.
No. 8	do	80.00	70 0	16 0	4 0	1908	do.
No. 9	do	80.00	70 0	16 0	4 0	1908	do.
No. 10	do	80.00	70 0	16 0	4 0	1908	do.
No. 11	do	80.00	70 0	16 0	4 0	1908	do.
No. 12	do	50.00	44 0	20 0	3 0	1908	do.
No. 13	Coal barge	65.00	70 0	16 0	4 0		
No. 14[a]	Quarter boat	65.00	70 0	10 0	4 0		
No. 15	Scow	3.00	26 0	5 4	1 6	1908	Rock Falls, Ill.
No. 16	Scow	3.00	26 0	5 4	1 6	1908	Rock Falls, Ill.
No. 17	Deck barge	80.00	70 0	16 0	4 0	1909	Milan, Ill.
No. 18	do	80.00	70 0	16 0	4 0	1909	do.
No. 19	do	80.00	70 0	16 0	4 0	1909	do.
No. 20	do	80.00	70 0	16 0	4 0	1909	do.
No. 21	do	80.00	70 0	16 0	4 0	1909	do.
No. 22	do	80.00	70 0	16 0	4 0	1909	do.
No. 23	do	80.00	70 0	16 0	4 0	1909	do.
No. 24	do	80.00	70 0	16 0	4 0	1909	do.
No. 1	do	56.00	50 0	16 0	3 6	1893	Rock Falls, Ill.
No. 2	do	56.00	50 0	16 0	3 6	1893	do.
No. 6	do	265.00	100 0	20 0	4 6	1904	Beardstown, Ill.
No. 7	do	265.00	100 0	20 0	4 6	1905	do.
No. 1	Steam dredge	348.00	79 10	30 0	7 4	1879 1896	Beardstown, Ill. Rebuilt, Kampsville.
No. 2	do	384.00	79 10	30 0	8 0	1883 1896	Beardstown, Ill. Rebuilt, Kampsville.
None	Office boat	160.00	100 0	20 0	4 0	1878 1899	Peoria, Ill. Rebuilt, Kampsville.
No. 1	Quarter boat	65.00	52 0	16 0	3 10	1894	do.
Margaret	do	345.00	100 0	26 0	4 3	1893	Gasconade, Mo.
No. 5	Dump scow	85.00	70 0	18 0	5 3	1895	Davenport, Iowa.
No. 6	do	85.00	70 0	18 0	5 3	1895	do.
No. 8	do	85.00	70 0	18 0	5 3	1900	Kampsville, Ill.
No. 9	do	85.00	70 0	18 0	5 3	1900	do.
No. 10	do	85.00	70 0	18 0	5 3	1900	do.
No. 11	do	85.00	70 0	18 0	5 3	1907	Beardstown, Ill.
No. 12	do	85.00	70 0	18 0	5 3	1907	do.
No. 13	do	85.00	70 0	18 0	5 3	1908	do.

CINCINNATI, OHIO, FIRST DISTRICT.

Nell	Gasoline launch	1.50	25 0	5 6	2 3	1893	Gloucester City, N.J.
Tender E. A. W	Steam launch	21.00	30 0	9 6	2 6	1901	New Albany, Ind.
Indiana	Hydraulic and grapple dredge.	288.00	125 0	34 0	6 10	1908	Jeffersonville, Ind.
Ohio	Dipper dredge	213.00	110 0	31 6	6 8	1880	St. Louis, Mo.
Oswego	do	160.00	92 0	31 6	6 1	1883	do.
E. A. Woodruff	Snag boat	640.30	220 0	48 0	7 6	1874-1876	Newport, Ky. Pittsburg, Pa.
No. 1	Dump scow	68.90	75 0	20 0	5 8	(c)	Elizabeth, Pa.
No. 2	do	68.90	75 0	20 0	5 8	(c)	do.
No. 3	do	68.90	75 0	20 0	5 8	(c)	do.
No. 4	do	68.90	75 0	20 0	5 8	1895	Jeffersonville, Ind.
No. 1	Decked flatboat	83.70	100 0	20 0	5 3	1897	Cincinnati, Ohio.
No. 2	do	75.00	100 0	20 0	5 0	1909	Levanna, Ohio.
No. 3	Flatboat	4.50	26 0	4 6	1 6	1897	Cincinnati, Ohio.
No. 4	do	4.50	26 0	4 6	1 6	1897	do.
No. 5	do	8.00	35 0	9 0	1 7	1901	Paducah, Ky.
No. 6	do	101.00	110 0	24 0	5 0	1908	Ambridge, Pa.
Nos. 1 to 10	Pontoons	16.00	40 0	12 0	3 2	1908	Springfield, Ill.

[a] Transferred from Rock Island district.

[b] Not known.

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employed in the Engineer Department at Large on June 30, 1910—Continued.

CHICAGO, ILL., SECOND DISTRICT—Continued.

Purchased. When.	Purchased. Where.	Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
.....	.....	Wood.	$550.00	$352.00	Good.	Illinois and Mississippi Canal.	Illinois and Mississippi Canal.
.....	.....	...do...	550.00	352.00	...do...	.....do.....	Do.
.....	.....	...do...	550.00	352.00	...do...	.....do.....	Do.
.....	.....	...do...	550.00	325.00	...do...	.....do.....	Do.
.....	.....	...do...	550.00	352.00	...do...	.....do.....	Do.
.....	.....	...do...	550.00	352.00	...do...	.....do.....	Do.
.....	.....	...do...	550.00	352.00	...do...	.....do.....	Do.
.....	.....	...do...	550.00	352.00	...do...	.....do.....	Do.
.....	.....	...do...	550.00	352.00	...do...	.....do.....	Do.
.....	.....	...do...	550.00	325.00	...do...	.....do.....	Do.
1908	Colona, Ill.....	...do...	200.00	128.00	Poor..	.....do.....	Do.
1908	.....	...do...	(b)	.....	Fair..	.....do.....	Do.
.....	.....	...do...	25.00	16.00	Good..	.....do.....	Do.
.....	.....	...do..	$25.00	$16.00	Good..	.....do.....	Do.
.....	.....	...do...	838.44	838.44	...do...	.....do.....	Do.
.....	.....	...do...	838.44	838.44	...do...	.....do.....	Do.
.....	.....	...do...	838.44	838.44	...do...	.....do.....	Do.
.....	.....	...do...	838.44	838.44	...do...	.....do.....	Do.
.....	.....	...do...	838.44	838.44	...do...	.....do.....	Do.
.....	.....	...do...	838.44	838.44	...do...	.....do.....	Do.
.....	.....	...do...	838.44	838.44	...do...	.....do.....	Do.
.....	.....	...do...	838.44	838.44	...do...	.....do.....	Do.
.....	.....	...do...	838.44	838.44	...do...	.....do.....	Do.
.....	.....	...do...	400.00	200.00	Fair...	Improving Illinois River.	Do.
.....	.....	...do...	400.00	100.00	Poor..	.....do.....	Do.
.....	.....	...do...	1,200.00	900.00	Good..	.....do.....	Improving Illinois River.
.....	.....	...do...	1,200.00	1,000.00	...do...	.....do.....	Do.
.....	.....	...do...	15,000.00	4,000.00	Poor..	.....do.....	Do.
.....	.....	...do...	15,500.00	4,000.00	...do...	.....do.....	Do.
.....	.....	...do...	5,000.00	600.00	Poor hull.	.....do.....	Do.
.....	.....	...do...	500.00	40.00	Poor..	.....do.....	Do.
.....	.....	...do...	(c)	4,000.00	Good..	.....do.....	Do.
.....	.....	...do...	1,475.00	500.00	Poor..	.....do.....	Illinois and Mississippi Canal.
.....	.....	.do...	1,475.00	1,100.00	Good..	.....do.....	Improving Illinois River.
.....	.....	...do...	1,150.00	500.00	Fair...	.....do.....	Illinois and Mississippi Canal.
.....	.....	...do...	1,500.00	200.00	Poor..	.....do.....	Improving Illinois River.
.....	.....	...do...	1,500.00	200.00	...do...	.....do.....	Do.
.....	.....	...do...	1,350.00	1,200.00	Good..	.....do.....	Do.
.....	.....	...do...	1,350.00	1,200.00	...do...	.....do.....	Do.
.....	.....	...do...	1,350.00	1,250.00	...do...	.....do.....	Do.

CINCINNATI, OHIO, FIRST DISTRICT.

1893	Gloucester City, N. J.	Wood.	$1,102.50	$800.00	Good..	Ohio River.....	Improving Ohio River.
.....	.....	Steel..	2,358.33	1,800.00	...do...	.....do.....	Do.
.....	.....	...do...	100,586.13	100,586.13	...do...	.....do.....	Do.
.....	.....	Iron...	32,000.00	35,000.00	...do...	.....do.....	Do.
.....	.....	...do...	30,500.00	30,000.00	...do...	.....do.....	Do.
.....	.....	Iron, steel, and wood.	126,137.00	60,000.00	Fair...	.....do.....	Do.
.....	.....	Wood.	3,889.32	4,000.00	...do...	.....do.....	Do.
.....	.....	...do...	3,889.32	4,000.00	...do...	.....do.....	Do.
.....	.....	...do...	3,889.32	4,000.00	...do...	.....do.....	Do.
.....	.....	...do...	2,750.00	4,500.00	Good..	.....do.....	Do.
.....	.....	...do...	1,194.00	400.00	Fair...	.....do.....	Do.
.....	.....	...do...	1,750.00	1,750.00	Good..	.....do.....	Do.
.....	.....	Steel..	94.00	37.50	Fair...	.....do.....	Do.
.....	.....	...do...	94.00	37.50	...do...	.....do.....	Do.
.....	.....	Wood.	100.00	30.00	Poor..	.....do.....	Do.
.....	.....	Steel..	7,425.00	7,425.00	Good..	.....do.....	Do.
.....	.....	...do...	13,800.00	13,800.00	...do...	.....do.....	Do.

c Unknown. d Remodeled 1905–6. e Rebuilt 1904. f Rebuilt 1908.

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TABLE V.—*Statement of floating plant owned by the United States and*

CINCINNATI, OHIO, SECOND DISTRICT.

Name or number.	Class and description.	Tonnage.	Dimensions.			Built.	
			Length.	Width.	Depth.	When.	Where.
			Ft. in.	*Ft. in.*	*Ft. in.*		
Kentucky[a]	Towboat, stern-wheel	244.00	148 0	34 0	5 6	1909	Jeffersonville, Ind.
Gregory	do	163.00	134 0	24 10	4 0	1910	do
Vega	do	90.00	104 0	17 4	4 0	1901	do
Merrill	do	125.00	115 0	22 0	3 6	1907 1908	do
Pearl	Gasoline launch	5.00	40 0	7 6	4 0	1899	Grand Rapids, Mich.
Pioneer	do	4.00	35 0	8 6	4 0		
Malta	Endless-chain or ladder dredge.	160.00	70 0	31 4	6 10	1887 1888	Bucyrus, Ohio
No. 1	Dipper dredge	140.00	80 0	30 0	6 9	1901	Jeffersonville, Ind.
No. 2	Dipper dredge	75.00	72 0	19 0	5 5	1908 1909	Hull built Cincinnati, Ohio. Machinery purchased Marion, Ohio.
No. 1	Derrick and pile driver	80.00	65 0	30 0	4 4	1896	Cincinnati, Ohio.
No. 2	do	50.00	60 0	26 0	3 0	1895	do
No. 3	Center dumping scow	150.00	56 6	26 9	6 1	1904	do
No. 4	do	150.00	56 6	26 9	6 1	1904	do
Nos. 1 and 2	Side dump scows	10ea.	75 0	17 0	6 4.5	1907	Pittsburg, Pa.
Nos. 3 and 4	do	10ea.	75 0	17 0	6 4	1899	Elizabeth, Pa.
Piledriver[d]	Floating, steam, with derrick.	110.00	50 0	28 0	3 10	1899	Cincinnati, Ohio.
No. 3	Decked barge	97.00	75 0	15 0	4 0	1909 1910	do
No. 4	do	97.00	75 0	14 0	3 7	1900	do
No. 5	do	97.00	75 0	14 0	3 7	1897	do
No. 5	do	100.00	98 0	18 0	4 0	1895	do
No. 6	do	100.00	98 0	18 0	4 0	1895	do
No. 7	do	90.00	80 0	20 0	5 0	1895	do
No. 8	do	95.00	88 0	19 0	4 0	1896	do
No. 9	do	95.00	90 0	18 0	4 0	1899	Leavenworth, Ind.
Nos. 10 and 11	Decked barges	120ea.	99 0	20 0	6 0	1908	Pt. Pleasant, W. Va.
No. 12	Open barge	30.00	55 0	10 0	3 6	1896	Cincinnati, Ohio.
No. 13	Decked barge	120.00	99 0	20 0	5 4	1910	Pt. Pleasant, W. Va.
Jumbo	do	10.00	36 0	9 0	2 0	1896	Cincinnati, Ohio.
No. 2	Quarterboat (quarters for crew of Dredge Malta).	22.00	75 0	14 0	1 9	1904	do
No. 1	Quarterboat (quarters for employees in remote localities).	50.00	90 0	14 0	3 6	1900	do
No. 2	do	20.00	78 0	11 0	4 0	1898	do
No. 3	Quarterboat (quarters for survey parties).	10.00	53 0	9 0	1 6		
Survey No. 3	Quarterboat	13.00	60 0	10 0	0 10	1899	Louisa, Ky.
Catlettsburg No. 1	Maneuvering boat	41.66	50 0	20 0	3 4	1904	do
Kavanaugh No. 1	do	41.66	50 0	20 0	3 4	1904	do
Louisa No. 2	do	69.22	60 0	26 0	3 4	1909	do
Louisa No. 3	Push boat	20.34	40 0	10 0	1 10		
Kavanaugh No. 2	do	16.88	36 0	10 0	1 8		
Louisa No. 1	do	16.88	36 0	10 0	1 8	1910	Louisa, Ky.
Kentucky No. 1	Needle boat	10.00	54 0	10 0	1 10	1909	Cincinnati, Ohio.
Muskingum No. 1	Work and store boat	30.00	50 0	12 0	3 2	1910	do

[a] Increase in length due to reconstruction of wheel, etc.

[b] Reconstructed 1909.

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employed in the Engineer Department at Large on June 30, 1910—Continued.

CINCINNATI, OHIO, SECOND DISTRICT.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
When.	Where.						
.....	.....	Wood.	$27,078.50	$25,000.00	Good..	Kentucky River..	Improving Kentucky River.
.....	.....	...do...	16,915.00	16,000.00	New..	.....do.....	Do.
.....	.....	...do...	9,805.00	7,000.00	Fair...	Muskingum River.	Improving Muskingum River.
.....	.....	...do...	14,400.00	12,240.00	Good..	.....do.....	Do.
.....	.....	...do...	1,705.00	800.00	Fair...	Kentucky River..	Improving Kentucky River.
1908	Bay City, Mich..	...do...	1,975.00	1,750.00	Good..	Big Sandy River..	Improving Big Sandy River.
(b)	.....	...do...	13,000.00	11,500.00	...do...	Muskingum River.	Improving Muskingum River.
.....	.....	...do...	22,272.00	12,000.00	Fair...	Kentucky River..	Improving Kentucky River.
.....	.....	...do..	10,306.62	10,000.00	Good..	.....do.....	Do.
.....	.....	...do...	(c)	2,000.00	Fair...	.....do.....	Do.
.....	.....	...do...	(c)	1,500.00	...do...	.....do.....	Do.
.....	.....	...do...	2,650.00	1,400.00	Good..	Muskingum River.	Improving Muskingum River.
.....	.....	...do...	2,650.00	1,400.00	...do...	.....do.....	Do.
.....	.....	...do...	6,216.00	4,000.00	Fair...	Kentucky River..	Improving Kentucky River.
.....	.....	...do...	3,400.00	800.00	Poor..	.....do.....	Do.
.....	.....	...do...	1,665.00	1,500.00	Good..	Muskingum River.	Improving Muskingum River.
.....	.....	...do...	844.24	844.00	New..	.....do.....	Do.
.....	.....	...do...	600.00	300.00	Fair...	.....do.....	Do.
.....	.....	...do...	397.00	180.00	...do...	.....do.....	Do.
.....	.....	...do...	(c)	800.00	...do...	Kentucky River..	Improving Kentucky River.
.....	.....	...do...	(c)	800.00	...do...	.....do.....	Do.
.....	.....	...do...	(c)	800.00	...do...	.....do.....	Do.
.....	.....	...do...	(c)	800.00	...do...	.....do.....	Do.
.....	.....	...do...	670.00	250.00	Poor..	.....do.....	Do.
.....	.....	...do...	4,300.00	3,600.00	Good..	.....do.....	Do.
.....	.....	...do...	(c)	100.00	Poor..	.....do.....	Do.
.....	.....	...do...	2,200.00	2,200.00	New..	.....do.....	Do.
.....	.....	...do...	(c)	25.00	Poor..	.....do.....	Do.
.....	.....	...do...	1,600.00	1,215.00	Good..	Muskingum River.	Improving Muskingum River.
.....	.....	...do...	1,200.00	500.00	Fair...	Kentucky River..	Improving Kentucky River.
.....	.....	...do...	(c)	400.00	...do...	.....do.....	Do.
1906	Irvine, Ky.....	...do...	(c)	.....	Worthless.	.....do.....	Do.
.....	.....	...do...	204.00	.....	...do..	Big Sandy River..	Improving Big Sandy River.
.....	.....	...do...	1,592.04	1,050.00	Good..	.....do.....	Do.
.....	.....	...do...	1,592.04	1,050.00	...do...	.....do.....	Do.
.....	.....	...do...	3,238.00	3,000.00	...do...	.....do.....	Do.
1907	Catlettsburg, Ky	...do...	65.00	40.00	Fair...	.....do.....	Do.
1909	Louisa, Ky.....	...do...	100.00	85.00	Good..	.....do.....	Do.
.....	.....	...do...	124.50	124.50	New..	.....do.....	Do.
.....	.....	...do...	235.63	230.00	Good	Kentucky River..	Improving Kentucky River.
.....	.....	...do...	1,233.95	1,200.00	New..	Muskingum River	Improving Muskingum Rvier.

c Unknown.

d Increase in tonnage and dimensions due to reconstruction in 1909-10.

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TABLE V.—*Statement of floating plant owned by the United States and* CLEVELAND, OHIO.

Name or number.	Class and description.	Tonnage.	Dimensions. Length.	Width.	Depth.	Built. When.	Where.
			Ft. in.	*Ft. in*	*Ft. in.*		
Burton	Seagoing suction dredge.	1,200.00	177 0	38 0	19 0	1905	Sparrow Point, Md.
Maumee	Dipper dredge	(a)	100 0	36 0	10 0	1893	Cleveland, Ohio
Visitor	Steam tug	70.11	80 8	20 0	6 4	1892	Detroit, Mich
Spear	do	(a)	85 0	20 0	10 0	1882	Green Bay, Wis
Quest	do	(a)	65 0	15 0	8 0	1903	Ashtabula, Ohio
Inspector	Gasoline launch	(a)	34 0	7 0	4 6	1901	Detroit, Mich
Ariel	do	6.00	36 0	7 6	5 0	1905	Ashtabula, Ohio
Burton No. 1	do	(a)	16 0	4 6	3 0	1905	Cleveland, Ohio
No. 1	Dump scow, 3 pockets	(a)	92 0	24 0	7 6	1893	do
No. 2	do	(a)	92 0	24 0	7 6	1893	do
No. 3	do	(a)	92 0	24 0	7 6	1893	do
No. 4	Dump scow, 7 pockets	(a)	125 0	34 0	10 6	1907	Port Clinton, Ohio
No. 5	do	(a)	125 0	34 0	10 6	1907	do
No. 1	Lighter	(a)	80 0	19 6	6 6	1893	Cleveland, Ohio
No. 1	Deck scow	(a)	30 0	18 0	4 0	1902	do
No. 2	do	(a)	23 1	11 6	2 6	1906	Ashtabula, Ohio
No. 1	Barge	(a)	120 0	24 0	5 0	1903	Sandusky, Ohio
DALLAS, TEX.							
Brazos	Steam launch	15.00	50 0	14 0	2 2	1903	Old Washington, Tex.
C. A. Culberson	Snag boat	230.00	125 0	28 8	5 0	1908	Jeffersonville, Ind.
Geo. A. Trumbull	Gasoline launch	2.00	21 0	5 0	2 0	1906	Racine, Wis.
Ino	do	.50	20 0	4 3	1 6	1908	Lake Charles, La.
Morris Sheppard	do	5.00	35 0	7 6	3 0	1907	Racine, Wis.
Navasota	Snag boat	140.00	90 0	25 0	5 0	1904	Orange, Tex.
Port Arthur	Suction dredge		60 0	28 0	6 0		Port Arthur, Tex.
Sabine	do	600.00	145 0	35 0	8 0	1901	New York, N. Y.
Sextant	Gasoline launch		30 0	6 6	2 6	1906	Bascom, Ohio
Transit	do		30 0	6 6	2 5	1892	New York, N. Y.
Trinity [b]	Snag boat and dredge	260.00	125 0	25 0	5 0	1894	Texas City, Tex.
DETROIT, MICH. (LAKE SURVEY).							
Surveyor	Survey steamer	190.00	86 9	20 1	8 5	1891	South Haven, Mich.
Col. J. L. Lusk	do	169.09	124 6	19 4	9 8	1884	Manistee, Mich.
Search	do	140.00	133 0	17 0	10 0	1896	Buffalo, N. Y.
U. S. Lake Survey No. 1.	Tug	24.00	69 0	13 6	4 5	1891	Oshkosk, Wis.
U. S. Lake Survey No. 2.	Survey steamer	44.00	60 6	14 6	7 6	[d]1909	Detroit, Mich.
U. S. Lake Survey No. 3.	Motor launch	(c)	22 0	6 0	3 0	1902	St. Joseph, Mich.
U. S. Lake Survey No. 4.	do	(c)	36 0	9 10	4 6	1905	Detroit, Mich.
U. S. Lake Survey No. 5.	do	(c)	36 0	8 8	4 0	1909	Manitowoc, Wis.
U. S. Lake Survey No. 6.	do	(c)	36 0	8 8	4 0	1909	do
No. 1	Catamaran	(c)	27 0	21 0	2 0	1898	Detroit, Mich.
No. 2	do	(c)	27 0	21 0	2 0	1899	do
No. 3	do	(c)	27 0	21 0	2 0	1899	do
No. 1	Sweeping float (2 sections).	(c)	30 0	80 0	3 4	1902	Port Huron, Mich.

[a] Not known.
[b] Now on marine ways undergoing extensive repairs.
[c] Unknown.
[d] Rebuilt by U. S. Lake Survey; completed in 1910.

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employed in the Engineer Department at Large on June 30, 1910—Continued.

CLEVELAND, OHIO.

Purchased. When.	Purchased. Where.	Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
1904	Spafrow Point, Md.	Steel..	$184,300.00	$150,000.00	First class.	General work of district as needed.	Cleveland district works.
1893	Cleveland, Ohio.	Wood.	28,000.00	50,000.00	...do...	.....	
1897	Sandusky, Ohio.	Steel..	14,000.00	10.000.00	Good..	.....	
1893	Port Huron, Mich.	Wood.	8,000.00	5,000.00	...do...	.....	
1903	Ashtabula, Ohio.	...do...	7,000.00	4,000.00	...do...	.....	
1901	Detroit, Mich...	...do...	1,375.00	500.00	...do...	.....	
1905	Ashtabula, Ohio.	...do...	500.00	500.00	...do...	.....	
1905	Cleveland, Ohio.	...do...	250.00	100.00	...do...	.....	
1893	.....do.....	...do...	3,000.00	1.000.00	...do...	.....	
1893	.....do.....	...do...	3,000.00	1,000.00	...do...	.....	
1893	.....do.....	...do...	3,000.00	1,000.00	...do...	.....	
1907	Port Clinton, Ohio.	...do...	14,428.00	12,000.00	...do...	.....	
1907	.....do.....	...do...	14,477.00	12,000.00	...do...	.....	
1893	Cleveland, Ohio.	...do...	2,000.00	1,500.00	...do...	.....	
1902	.....do.....	...do...	700.00	500.00	...do...	.....	
1906	Ashtabula, Ohio.	...do...	100.00	100.00	...do...	.....	
1903	Sandusky, Ohio.	...do...	4,100.00	2,000.00	Fair...	.....	

DALLAS, TEX.

.....	.....	Wood.	.....	$3,500.00	Excellent.	Brazos River, Tex.	Improving Brazos River, Tex.
1908	Jeffersonville, Ind.	...do...	$21,840.00	18.000.00	Good .	Red River, Tex...	Improving Red River, La. and Ark., above Fulton, Ark.
1906	Racine, Wis.....	...do...	500.00	100.00	Poor..	Trinity River, Tex	Improving Trinity River, Tex.
1909	Liberty, Tex....	...do...	125.00	75.00	Fair ..	.....do.....	Do.
1907	Racine, Wis.....	...do...	2,050.00	1,500.00	Good .	Red River, Tex...	Improving Red River, La. and Ark., above Fulton, Ark.
1907	Galveston, Tex..	...do...	2,400.00	8,000.00	...do...	Brazos River, Tex.	Improving Brazos River, Tex.
1907	Port Arthur, Tex	...do...	.....	4,000.00	Very poor.	Port Arthur, Tex..	Port Arthur Canal, Tex.
.....	.....	...do...	.....	60.000.00	Fair ..	Sabine Pass, Tex..	Improving Sabine Pass, Tex.
.....	.....	...do...	.....	1,500.00	Very good	Port Arthur, Tex..	Waterways, in vicinity of Port Arthur, Tex.
1892	New York, N. Y	...do...	.....	300.00	Fair...	Sabine Pass, Tex..	Do.
.....	.....	...do...	.....	6,000.00	Poor..	Trinity River, Tex	Improving Trinity River, Tex.

DETROIT, MICH. (LAKE SURVEY).

1903	Mackinac, Mich.	Wood.	(c)	$18,000.00	Good .	Surveys.....	Survey of northern and northwestern lakes.
1891	Manistee, Mich..	...do...	(c)	26,000.00	...do...	.....do.....	Do.
1899	New York, N. Y	Steel..	(c)	25,000.00	...do...	.....do.....	Do.
1899	Milwaukee, Wis.	Wood.	$6,020.44	3,000.00	Fair ..	.....do.....	Do.
.....	.....	...do...	(e)	5,000.00	Good .	.....do.....	Do.
1902	St. Joseph, Mich	...do...	940.00	400.00	Fair...	.....do.....	Do.
.....	(e)	...do...	1,000.00	1,000.00	Good .	.....do.....	Do.
.....	(f)	...do...	1,425.00	1,425.00	...do...	.....do.....	Do.
.....	(f)	...do...	1,425.00	1,425.00	...do...	.....do.....	Do.
1898	Detroit, Mich...	Steel and wood.	1,248.33	500.00	Fair...	.....do.....	Do.
1899	.....do.....	...do...	1,248.00	500.00	...do...	.....do.....	Do.
1899	.....do.....	...do...	1,248.00	500.00	...do...	.....do.....	Do.
1902	Port Huron, Mich.	...do...	g 8,000.00	h 1,500.00	Good .	.....do.....	Do.

c Built by U. S. Lake Survey.
f Built for U. S. Lake Survey.
g For 7 sections.
h For 2 sections.

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TABLE V.—*Statement of floating plant owned by the United States and*

DETROIT, MICH.—(R. & H.)

Name or number.	Class and description.	Tonnage.	Dimensions.			Built.	
			Length.	Width.	Depth.	When.	Where.
			Ft. in.	*Ft. in.*	*Ft. in.*		
Alfred Noble	Survey steamer	34.00	67 6	15 6	7 1	1905	Toledo, Ohio
Hancock	do	123.66	96 6	17 0	7 6	[a]1890	Saugatuck, Mich.
West Neebish	Tug	11.00	53 3	15 1	8 2	1909	Sault Ste. Marie, Mich.
Sapper	do	59.00	68 0	16 10	9 7	[b]1888	Buffalo, N. Y.
Don	Gasoline launch		41 9	9 7	3 6	1904	Detroit, Mich.
No. 1	do	1.00	25 0	5 6	4 0	1894	New York, N. Y.
Hancock No. 1	do		15 6	4 6	2 6	1910	Detroit, Mich.
Hay Lake	Quarter boat		70 0	22 0	4 4	1895	Sault Ste. Marie, Mich.

DULUTH, MINN.

Vidette	Steam yacht	33.87	90 0	14 9	10 0	1886	Poughkeepsie, N. Y.
Tangent	Steam launch	8.00	41 0	8 0	4 7	1889	Chicago, Ill.
Circle	Steam tug	10.00	46 5	13 11	6 7	1885	Buffalo, N. Y.
Essayone	do	130.00	85 0	21 0	11 6	1908	Muskegon, Mich.
Curve	Naphtha launch		22 6	5 6	3 6	1897	St. Joseph, Mich.
Chord	do		22 6	5 6	3 6	1897	do
Arc	do		16 0	4 6	3 0	1897	do
No. 1	Flat scow	128.00	90 0	20 0	7 0	[c]1900	Duluth, Minn.
No. 2	do	29.00	51 0	17 6	3 6	(d)	Unknown
No. 3	do	4.00	18 0	12 0	2 0	(d)	do
No. 4	do	46.00	57 0	24 0	3 6	1904	Superior Entry, Wis.
No. 5	do	123.00	102 0	24 0	5 6	1905	do
No. 6	do	600.00	102 0	32 0	8 0	1906	do
No. 7	do	600.00	102 0	32 0	8 0	1907	do
No. 8	do	75.00	70 0	20 0	5 6	1907	do
No. 9	do	8.00	20 0	15 0	3 0	1899	Houghton, Mich.
No. 10	do	60.00	60 0	26 0	3 6	1908 1909	Superior Entry, Wis.

[a] Rebuilt at Detroit, Mich., 1906. [b] Rebuilt at Toledo, Ohio, 1901. [c] Rebuilt.

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employed in the Engineer Department at Large on June 30, 1910—Continued.

DETROIT, MICH.—(R. & H.)

Purchased.		Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
When.	Where.						
1905	Toledo, Ohio....	Steel..	$19,800.00	$15,000.00	Fair...	St. Marys River...	Improving middle and west Neebish channels.
.....	.....	Wood.	10,000.00	7,500.00	...do...	St. Marys, St. Clair, and Detroit rivers, and lakes Huron and St. Clair.	Ship channel connecting waters of the Great Lakes between Chicago, Duluth, and Buffalo.
1909	Sault Ste. Marie, Mich.	...do...	7,668.50	7,000.00	Good .	St. Marys River, Mich.	Improving St. Marys River, Mich., Hay Lake and Neebish channels.
1903	Detroit, Mich...	...do...	9,500.00	6,000.00	Fair...	Harbor Beach, Mich.	Improving harbor at Cheboygan, Alpena, Harbor Beach, and Saginaw and Black rivers.
1907	.....do.....	...do...	2,170.00	1,500.00	...do...	Detroit River.....	Improving Detroit River, Mich.
1896	Chattanooga, Tenn.	...do...	600.00	300.00	Fair...	St. Clair Flats Canal.	Harbor of Refuge, Harbor Beach, Mich.
1910	Detroit, Mich...	...do...	199.00	199.00	Good .	With U. S. S. Hancock.	Same as U. S. S. Hancock.
.....	.....	...do...	3,300.00	1,750.00	Fair...	St. Marys River...	Improving Hay Lake Channel Mich.

DULUTH, MINN.

1897	Duluth, Minn...	Wood.	$7,000.00	$5,000.00	Good..	Duluth, Minn., district.	Duluth - Superior Harbor.
1889	Chicago, Ill.....	...do ..	1,900.00	600.00	Fair...	Duluth - Superior Harbor.	Do.
1903	Duluth, Minn...	...do..	2,500.00	3,000.00	Good..	Houghton, Mich..	Portage canals, Mich.
1909	Built under contract, Racine Boat Manufacturing Co.	Steel..	35,950.00	40,000.00	...do...	Duluth - Superior Harbor.	Superior Entry, Wis.
1897	St. Joseph, Mich.	Wood.	800.00	300.00	Fair...	.....do.....	Duluth - Superior Harbor.
1897	.....do.....	...do...	800.00	300.00	...do ..	.....do.....	Do.
1897	.....do.....	...do ..	375.00	125.00	...do ..	Houghton, Mich..	Do.
1903	Duluth, Minn...	...do ..	1,500.00	2,000.00	Good .	Duluth, Minn., and Superior, Wis.	Do.
.....	(c)	...do ..	.....	50.00	Fair...	Duluth - Superior Harbor.	Do.
1904	Duluth, Minn...	...do ..	35.00	20.00	...do ..	.....do.....	Do.
.....	.....	...do ..	1,000.00	800.00	...do ..	.....do.....	Do.
.....	.....	...do ..	2,272.00	3,550.00	Good..	.....do.....	Do.
.....	.....	...do ..	6,123.00	5,000.00	...do ..	.....do.....	Do.
.....	.....	...do ..	6,600.00	5,320.00	...do ..	.....do.....	Do.
.....	.....	...do ..	3,000.00	3,000.00	...do ..	Houghton, Mich...	Portage canals, Mich.
.....	.....	...do ..	60.00	20.00	Poor..	.....do.....	Do.
.....	.....	...do ..	2,498.00	2,000.00	A 1....	Duluth - Superior Harbor.	Superior Entry, Wis.

[a] Unknown.

[c] Picked up on beach after being abandoned by owner.

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TABLE V.—*Statement of floating plant owned by the United States and*

GALVESTON, TEX.

Name or number.	Class and description.	Tonnage.	Dimensions.			Built.	
			Length.	Width.	Depth.	When.	Where.
			Ft. in.	*Ft. in.*	*Ft. in.*		
Galveston	Seagoing suction dredge.	3,500.0	304 0	51 0	27 0	1908	Sparrow Point, Md.
Gen. C. B. Comstock	do	764.13	177 0	35 6	16 0	1895	Perth Amboy, N. J.
Col. A. M. Miller	Suction dredge	942.60	138 6	37 0	13 0	1906	Galveston, Tex.
Capt. C. W. Howell	Suction dredge and snagboat.	200.00	125 0	25 0	5 0	1904	Texas City, Tex.
Guadalupe	Dredge and snagboat	227.00	118 0	28 0	5 9	1908	Victoria, Tex.
Captain Talfor	Tugboat	43.00	77 0	16 2	8 0		
Helen	Steam launch	33.00	56 0	12 4	6 0	1901	Galveston, Tex.
Bastrop	Gasoline launch	16.00	46 6	11 3	5 0	1908	Cedar Bayou, Tex.
Hill	do	6.90	30 9	7 7	2 6	1905	Galveston, Tex.
Bar	do	2.00	27 0	7 0	3 0	1907	do
Victoria	do	3.00	27 0	6 0	3 0	1908	do
Launch G	do		25 0	8 0	3 0	1908	Camden, N. J.
C. B. C	do	2.00	20 4	6 0	3 0	1910	Galveston, Tex.
Pigmy	do	45.00	54 0	22 0	3 8	1902	do
Derrick Barge No. 1	Derrick barge	115.34	65 0	27 0	5 6	1908	do
Derrick Barge No. 2	do	65.00	50 0	22 0	7 0	1907	Lockport, La.
Quarter boat No. 1	Quarter boat	80.68	60 8	23 0	7 6	1907	Galveston, Tex.
D. 1	Dump scow	65.00	50 0	22 0	7 0	1907	Lockport, La.
D. 3	do	65.00	50 0	22 0	7 0	1907	do
D. 4	Oil and water barge	40.68	50 0	20 0	5 6	1908	Seabrook, Tex.
D. 5	do	144.00	80 0	28 0	8 0	1908	Galveston, Tex.

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employed in the Engineer Department at Large on June 30, 1910—Continued.

GALVESTON, TEX.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
When.	Where.						
1908	Sparrows Point, Md.	Steel..	$357,500.00	$339,625.00	Good..	Galveston Harbor, Tex.	Improving harbor at Galveston, Tex.
.....	.....	Wood.	86,000.00	81,000.00	...do..	Galveston, Tex....	Do.
.....	.....	...do..	102,000.00	81,600.00	...do..	Galveston Channel	Improving Galveston Channel.
.....	.....	...do..	18,000.00	36,000.00	...do..	Galveston Brazos Canal.	Improving West Galveston Bay Channel, Trinity River, Anahuac Channel, Cedar, Chocolate, and Bastrop bayous, Tex.
.....	.....	...do..	36,977.35	22,400.00	...do..	Galveston ship channel.	Inland waterway on coast of Texas-Guadalupe River.
1905	Mobile, Ala.....	...do..	12,000.00	12,800.00	...do..	Galveston, Tex....	Galveston Harbor and ship channel and Buffalo Bayou.
.....	.....	...do..	4,000.00	2,800.00	...do..	Galveston Bay....	Improving ship channel and Buffalo Bayou.
.....	.....	...do..	4,300.00	4,000.00	...do..	Galveston, Tex....	Improving inland waterway on coast of Texas.
.....	.....	...do..	2,000.00	2,000.00	...do..	.....do.....	River and harbor improvement.
.....	.....	...do..	1,300.00	1,150.00	...do..	Galveston, Tex., and vicinity.	Improving inland waterway on coast of Texas.
.....	.....	...do..	1,100.15	800.00	...do..	Guadalupe River, Tex.	Inland waterway on coast of Texas-Guadalupe River.
1908	Camden, N. J...	...do..	871.00	1,200.00	...do..	Galveston Harbor.	Improving harbor at Galveston, Tex.
.....	.....	...do..	558.24	558.24	...do..	Galveston, Tex....	Galveston Channel, Dredge Miller.
.....	.....	...do..	3,382.00	1,500.00	...do..	Galveston ship channel.	Do.
.....	.....	...do..	8,800.00	8,000.00	...do..	Guadalupe River, Tex.	Improving Galveston ship channel and Buffalo Bayou, Tex.
.....	.....	...do..	3,316.00	3,000.00	...do..	.....do.....	Galveston ship channel and Buffalo Bayou.
.....	.....	...do..	3,578.22	3,000.00	...do..	Galveston ship channel and Buffalo Bayou, Division 1 Dike.	Improving inland waterway on coast of Texas.
.....	.....	...do..	3,316.00	3,000.00	...do..	Galveston ship channel and Buffalo Bayou, Tex.	Improving Galveston ship channel and Buffalo Bayou, Tex.
.....	.....	...do..	3,316.00	3,000.00	...do..	Guadalupe River, Tex.	Do.
.....	.....	...do..	2,015.00	1,750.00	...do..	West Galveston Bay and Brazos River Canal.	Improving inland waterway on coast of Texas.
.....	.....	...do..	7,500.00	7,000.00	...do..	Harbor at Galveston, Tex.	Improving harbor at Galveston, Tex.

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TABLE V.—*Statement of floating plant owned by the United States and*

GRAND RAPIDS, MICH.

Name or number.	Class and description.	Tonnage.	Dimensions.			Built.	
			Length.	Width.	Depth.	When.	Where.
			Ft. in.	Ft. in.	Ft. in.		
Bertha S.	Naphtha launch	3.50	33 0	6 6	2 0	1897	Grand Rapids, Mich.
Engineer	do	5.33	37 6	7 8	3 0	1902	do
Gen. Gillmore	Tug	27.00	61 6	15 0	4 10	[a]1880	Chicago, Ill.
Col. Farquhar	Dipper dredge		76 0	24 0	6 0	1869	Grand Haven, Mich.
Gen. Meade	Suction dredge	1,200.00	177 0	38 0	19 0	1904	Sparrows Point, Md.
Gen. Ludlow	do	213.00	162 1	36 9	3 6	1904	Grand Haven, Mich.
Saginaw	Conveyor		83 9	32 0	6 7	[d]1891	Saginaw, Mich.
Pile driver	Jet pile driver		100 0	24 0	2 0	1897	Ludington, Mich.
Pile driver	G. R. No. 1	24.00	40 0	20 0	3 0	1897	do
Deck scow C. 1	Quarter-boat scow	42.00	70 0	20 0	3 7	[e]	St. Joseph, Mich.
Deck scow S. 2	Stone scow	46.00	50 0	24 0	4 0	1890	Michigan City, Ind.
Deck scow S. 3	do	87.00	93 7	24 0	4 0	1903	Grand Haven, Mich.
Deck scow S. 4	do	46.00	50 0	24 0	4 0	1903	do
Deck scow G. R. 2	Deck scow	30.00	50 0	20 0	3 0	1897	Ludington, Mich.
Deck scow No. 7	do	98.00	77 0	20 4	7 0	[e]	Unknown.
Messenger	Naphtha launch	1.33	17 7	5 6	2 3½	1907	[f]
Ludington	do	1.47	22 0	5 0	2 2½	1909	Grand Rapids, Mich.

GUANTANAMO, CUBA.

Pioneer	Self-propelling steam lighter.	200.00	90 0	28 0	7 6	1905	Jacksonville, Fla.
Frolic	Screw steamer	44.00	68 8	16 9	5 0	1905	Croton, N. Y.
Katherine	Naphtha launch	6.00	25 0	5 11	3 2	1899	New York, N. Y.

HONOLULU.

Melancthon	Barge	283.00	133 0	30 5	10 9	1867	North Bend, Oreg.
Wiki	Flat	100.00	60 0	25 0	6 0	1908	Pearl Harbor

[a] Rebuilt at Grand Haven, Mich., 1906.
[b] First cost.
[c] Rebuilding.
[d] Rebuilt from dredge to conveyor at Grand Haven, Mich., 1906.
[e] Unknown.

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employed in the Engineer Department at Large on June 30, 1910—Continued.

GRAND RAPIDS, MICH.

Purchased. When.	Purchased. Where.	Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
1897	Grand Rapids, Mich.	Wood.	$900.00	$400.00	Serviceable.	Grand River, Mich	Grand River, Mich
.....	.....	...do...	1,600.00	800.00	...do...	.....do.....	Do.
1889	Chicago, Ill.....	Iron and wood.	[b] 7,500.00 / [c] 5,000.00	3,500.00	...do...	.....do.....	Do.
.....	.....	Wood.	12,500.00 / 15,500.00	4,000.00	...do...	.....do.....	Harbors east shore Lake Michigan.
.....	.....	Steel..	177,953.00	164,000.00	Good..	Harbors east shore Lake Michigan.	Do.
.....	.....	...do...	49,300.00	39,500.00	...do...	Grand River, Mich	Grand River, Mich
1890	Saginaw, Mich...	Wood.	16,000.00	6,500.00	...do...	.....do.....	Do.
1889 / 1897	Chicago, Ill. (machinery). Ludington, Mich. (hull).	...do...	5,500.00	600.00	Serviceable.	.....do.....	Do.
1897	Ludington, Mich	...do...	410.00	100.00	...do...	.....do.....	Do.
.....	.....	...do...	Unknown.	100.00	...do...	.....do.....	St. Joseph, Mich.
.....	.....	...do...	1,250.00	150.00	...do...	.....do.....	Grand River, Mich
.....	.....	...do...	1,000.00	350.00	...do...	.....do.....	Do.
.....	.....	...do...	1,250.00	150.00	...do...	.....do.....	Do.
1897	Ludington, Mich	...do...	550.00	50.00	Unserviceable.	.....do.....	Do.
1891	Saginaw, Mich...	...do...	2,000.00	100.00	...do...	Grand River (laid off).	Harbors east shore Lake Michigan.
.....	.....	Wood.	300.00	250.00	Good..	Harbors east shore Lake Michigan.	Do.
1909	Grand Rapids, Mich.	...do...	426.00	400.00	...do...	Ludington, Mich..	Harbors, Ludington, Mich.

GUANTANAMO, CUBA.

1905	Guantanamo Bay, Cuba.	Wood.	$16,000.00	$500.00	Bad...	Guantanamo Bay, Cuba.	Fortifications in insular possessions (seacoast batteries).
1906	New York, N. Y.	...do...	6,275.00	200.00	...do...	.....do.....	Do.
1905	New London, Conn.	...do...	1,200.00	(g)			

HONOLULU.

1908	Honolulu.....	Wood.	$4,000.00	$2,000.00	Poor..	Between Honolulu and Pearl Harbor, Hawaii.	Fortifications in insular possessions, seacoast batteries in Hawaiian Islands.
(h)	.....	...do...	2,000.00	1,800.00	Good..	.....do.....	Do.

[f] Converted from a rowboat at Muskegon.
[g] Sold at auction December 6, 1909, per 25, Ind. E. D. 46285/640.
[h] Built by United States.

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TABLE V.—*Statement of floating plant owned by the United States and*

JACKSONVILLE, FLA.

Name or number.	Class and description.	Tonnage.	Dimensions.			Built.	
			Length.	Width.	Depth.	When.	Where.
			Ft. in.	Ft. in.	Ft. in.		
St. Johns	Seagoing suction dredge.	1,047.00	205 0	41 0	20 0	1905	Greenport, L. I.
Key West	do	498.73	141 0	31 0	15 0	1904	Belfast, Me.
Jacksonville	Stationary hydraulic dredge.	680.00	138 4	40 8	10 2	1903 1904	Jacksonville, Fla.
Florida	Self-propelling dredge and snag boat.	175.00	131 0	28 0	7 0	1904 1905	do
Suwanee	do	95.18	100 0	24 0	5 0	1889	Branford, Fla.
Kissimmee	Stationary hydraulic dredge.	65.00	60 0	18 0	2 0	1903	Kissimmee, Fla.
Hillsboro	Screw steamer	28.41	89 0	14 6	6 5	1889	City Island, N. Y.
Captain Maguire[a]	Gasoline tunnel screw launch.	49.00	67 0	17 7	2 6	1897	Palatka, Fla.
Enif	Naphtha launch	7.00	30 0	7 6	4 6	1899	South Boston, Mass.
Mac	do	3.50	27 0	6 0	3 0	1900	Mayport, Fla.
Violetta	do	8.00	31 0	11 4	4 4	1892	Brooklyn, N. Y.
Lunette (Istokpoga) [b]	do	3.00	20 0	5 6	3 6	1906	Tampa, Fla.
Freak	do	5.00	27 0	8 0	3 3	1909	Bradentown, Fla.
Hyacinth Elevator	Double-hull float with gas engine and elevator.	17.50	30 0	26 5	3 5	1909	Jacksonville, Fla.

KANSAS CITY, MO.

Missouri	Side-wheel snag boat	510.00	187 0	52 0	7 0	1888	Pittsburg, Pa.
James B. McPherson	Stern-wheel snag boat	340.00	170 0	36 0	5 7	1891	Dubuque, Iowa.
Mandan	do	150.00	138 0	24 0	4 7	1891	St. Louis, Mo.
Osage	Stern-wheel towboat	14.40	60 0	14 0	2 7	1897	Great Falls, Mont.
Arethusa	Steam tender	45.00	91 0	18 4	4 8	1894	Gasconade, Mo.
Atalanta	do	45.00	91 0	18 4	4 8	1894	do
Enquirer	Motor launch		30 4	7 0	3 0	1897	Long Island City
Missouri	do		24 8	5 6	2 5	1908	Grafton, Ill.
McPherson	do		20 0	5 0	2 3	1909	do
V-S	Pile driver and grader		70 0	18 0	4 0	1897	Sioux City, Iowa.
VII-Y	do		60 8	18 0	4 0	1899	do
1	Pile driver, flat bottom		76 0	19 0	4 6	1909	Gasconade, Mo.[c]
1-B	do		56 0	18 0	4 0	1895	Bismarck, N. Dak.
15	do		76 3	18 4	4 4	1883	St. Louis, Mo.
14	Mattress boat		70 4	25 3	2 9	1894	Gasconade, Mo.
1	do		80 0	30 0	4 0	1909	do
2	do		80 0	30 0	4 0	1909	do
1-Y	Punt, mattress boat		16 6	7 7	2 4	1898	Yankton, S. Dak.
6	Ponton, flat bottom		22 0	7 0	2 0	1900	Gasconade, Mo.
7	do		22 0	7 0	2 0	1900	do
8	do		22 0	7 0	2 0	1900	do
12	do		19 6	8 0	2 0	1909	do
13	do		19 6	8 0	2 0	1909	do

[c] Upper works rebuilt and gas engine installed in 1910.

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employed in the Engineer Department at Large on June 30, 1910—Continued.

JACKSONVILLE, FLA.

Purchased. When.	Purchased. Where.	Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
.....	.....	Wood.	$185,000.00	$175,000.00	Fair...	Southwest Pass, Mississippi River.	St. Johns River, Fla.
.....	.....	...do...	90,000.00	75,000.00	Good..	Key West Harbor, Fla.	Key West Harbor, Fla.
.....	.....	...do...	100,000.00	75,000.00	Fair...	Wilmington, N.C.	St. Johns River, Fla.
.....	.....	Steel..	80,000.00	70,000.00	...do...	West coast, Fla...	River and harbor works, Florida district.
.....	.....	Wood.	10,000.00	2,500.00	Poor..	.....do.....	Suwanee River, Fla.
.....	.....	...do...	1,800.00	1,400.00	Fair...	Kissimmee River.	Kissimmee River, Fla.
1900	New York, N.Y.	...do...	10,250.00	2,500.00	...do...	St. Johns River, Fla.	River and harbor works, Florida district.
1902	Palatka, Fla....	...do...	5,000.00	4,200.00	Good..	.....do.....	Do.
1899	Boston, Mass....	...do...	1,700.00	1,000.00	Fair...	.....do.....	St. Johns River, Fla.
.....	.....	...do...	200.00	350.00	...do...	Sarasota Bay, Fla.	Do.
.....	.....	...do...	1,000.00	1,200.00	Good..	Tampa Bay, Fla..	Do.
1907	Tampa, Fla.....	...do...	730.00	400.00	...do...	St. Johns River, Fla.	Kissimmee River, Fla.
.....	.....	...do...	530.00	500.00	...do...	Kissimmee River, Fla.	Do.
.....	.....	...do...	2,250.00	2,200.00	...do...	St. Johns River, Fla.	River and harbor works, Florida district.

KANSAS CITY, MO.

.....	.....	Steel..	$115,000.00	$100,000.00	Good..	Lower Missouri River.	Lower Missouri River.
.....	.....	...do...	45,500.00	35,000.00	...do...	.....do.....	Upper Missouri River.
.....	.....	...do...	21,500.00	14,000.00	...do...	Upper Missouri River.	Do.
.....	.....	Wood.	2,500.00	1,000.00	Fair...	Osage River.....	Do.
.....	.....	...do...	10,000.00	5,000.00	Good..	Lower Missouri River.	Lower Missouri River.
.....	.....	...do...	10,000.00	.....	Unserviceable.	.....do.....	Do.
1897	Long Island City, N.Y.	...do...	2,300.00	400.00	Fair...	Osage River.....	Do.
1908	Grafton, Ill.....	Steel..	484.00	484.00	Good..	Missouri River....	Do.
1909	.....do.....	...do...	387.00	387.00	...do...	.....do.....	Do.
.....	.....	Wood.	2,800.00	.....	Worthless.	Sioux City, Iowa..	Upper Missouri River.
.....	.....	...do...	3,400.00	1,600.00	Fair...	Lower Missouri River.	Do.
.....	.....	...do...	1,555.38	1,555.38	Good..	.....do.....	Lower Missouri River.
.....	.....	...do...	2,500.00	600.00	Poor..	Rockhaven, N. Dak.	Upper Missouri River.
1883	St. Louis, Mo...	...do...	1,980.00	1,800.00	Good..	Lower Missouri River.	Lower Missouri River.
.....	.....	...do...	1,200.00	.....	Worthless.	.....do.....	Do.
.....	.....	...do...	1,974.42	1,974.42	Good..	.....do.....	Do.
.....	.....	...do...	1,974.42	1,974.42	...do...	.....do.....	Do.
.....	.....	Wood.	50.00	.....	Worthless.	Sioux City, Iowa..	Upper Missouri River.
.....	.....	...do...	75.00	25.00	Fair...	Lower Missouri River.	Lower Missouri River.
.....	.....	...do...	75.00	25.00	...do...	.....do.....	Do.
.....	.....	...do...	75.00	25.00	...do...	.....do.....	Do.
.....	.....	...do...	73.00	73.00	Good .	.....do.....	Do.
.....	.....	...do...	73.00	73.00	...do...	.....do.....	Do.

[b] Name changed to Lunette.

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TABLE V.—*Statement of floating plant owned by the United States and*

KANSAS CITY, MO.—Continued.

Name or number.	Class and description.	Tonnage.	Dimensions.			Built.	
			Length.	Width.	Depth.	When.	Where.
			Ft. in.	Ft. in.	Ft. in.		
14	Ponton flat bottom		19 6	7 0	2 0	1909	Gasconade, Mo.
101	Barge, flat bottom		64 0	16 0	3 6	1893	Jeffersonville, Ind.
141	do		100 0	25 0	5 4	1899	Gasconade, Mo.
142	do		100 0	25 0	5 4	1899	do
143	do		100 0	25 0	5 4	1900	do
144	do		100 0	25 0	5 4	1900	do
145	do		100 0	25 0	5 4	1900	do
146	do		100 0	25 0	5 4	1900	do
147	do		100 0	25 0	5 4	1900	do
148	do		100 0	25 0	5 4	1900	do
149	do		100 0	25 0	5 4	1900	do
150	do		100 0	25 0	5 4	1900	do
151	do		100 0	25 0	5 4	1900	do
152	do		100 0	25 0	5 4	1900	do
153	do		100 0	20 0	5 0	1910	Rock Island, Ill.
154	do		100 0	20 0	5 0	1910	do
155	do		100 0	20 0	5 0	1910	do
156	do		100 0	20 0	5 0	1910	do
157	do		100 0	20 0	5 0	1910	do
158	do		100 0	20 0	5 0	1910	do
159	do		100 0	20 0	5 0	1910	do
160	do		100 0	20 0	5 0	1910	do
1-S	do		100 0	20 0	4 6	1895	Sioux City, Iowa.
11-S	do		70 0	20 0	5 0	1897	do
111-S	do		70 0	20 0	5 0	1897	do
V-S	do		66 0	18 0	4 0	1885	Bismarck, N. Dak.
IV-S	do		70 0	19 0	5 0	1897	Sioux City, Iowa.
1-EP	do		69 7	19 10	5 0	1899	Fort Benton, Mont.
11-EP	do		69 5	19 10	5 0	1899	do
111-EP	do		70 0	19 11	5 0	1899	Sioux City, Iowa.
IV-EP	do		70 0	19 10	5 0	1899	do
IV-Y	do		70 0	20 0	5 0	1897	do
V-Y	do		70 0	19 10	5 0	1899	do
VI-Y	do		70 0	19 10	5 0	1899	do
VII-P	do		70 0	20 0	4 4	1897	Pierre, S. Dak.
II-B	do		24 0	6 0	1 4	1895	Bismarck, N. Dak.
III-B	do		101 0	20 0	4 5	1897	do
IV-B	do		70 0	19 0	4 5	1897	do
V-B	do		50 0	12 0	2 8	1891	Rowes Landing, Mont.
VII-B	do		101 0	22 0	3 8	1885	Bismarck, N. Dak.
IX-B	do		80 0	20 0	4 0		
X-B	do		80 0	20 0	4 0		
2	do		50 0	15 0	1 7	1897	Gasconade, Mo.
2a	do		80 0	20 0	2 6	1905	do
2a	do		80 0	20 0	2 6	1905	do
3	do		72 0	20 0	4 0	1905	Osage River.
4	do		72 0	20 0	4 0	1905	do
6	do		72 0	20 0	4 0	1909	do
4	Skiff		26 8	6 8		1893	Gasconade, Mo.
6	do		15 0	3 6		1896	St. Louis, Mo.
20	do		17 0	6 4		1893	Gasconade, Mo.
59	do		17 6	4 6		1893	do
62	do		22 0	4 9		1904	do
63	do		22 0	4 8		1904	do
64	do		16 0	4 5	1 4	1909	do

* Not known.

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employed in the Engineer Department at Large on June 30, 1910—Continued.

KANSAS CITY, MO.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
When.	Where.						
.....	.....	Wood.	$73.00	$73.00	Good..	Lower Missouri River.	Lower Missouri River.
1893	Jeffersonville, Ind.	...do...	1,188.00	500.00	Fair...	.....do.....	Do.
.....	.....	...do...	2,815.00	1,800.00	Good..	Osage River.....	Do.
.....	.....	...do...	2,815.00	1,600.00	...do...	Lower Missouri River.	Do.
.....	.....	...do...	2,815.00	1,800.00	...do...	Osage River.....	Do.
.....	.....	...do...	2,815.00	1,800.00	...do...	Lower Missouri River.	Do.
.....	.....	...do...	2,815.00	1,800.00	...do...	.....do.....	Do.
.....	.....	...do...	2,815.00	1,800.00	...do...	.....do.....	Do.
.....	.....	...do...	2,815.00	1,800.00	...do...	.....do.....	Do.
.....	.....	...do...	2,815.00	1,250.00	...do...	.....do.....	Do.
.....	.....	...do...	2,815.00	1,500.00	...do...	.....do.....	Do.
.....	.....	...do...	2,815.00	1,250.00	...do...	.....do.....	Do.
.....	.....	...do...	2,815.00	1,250.00	...do...	.....do.....	Do.
.....	.....	...do...	2,815.00	1,250.00	...do...	.....do.....	Do.
1910	Rock Island, Ill.	...do...	1,500.00	1,500.00	...do...	.....do.....	Do.
1910	.....do.....	...do...	1,500.00	1,500.00	...do...	.....do.....	Do.
1910	.....do.....	...do...	1,500.00	1,500.00	...do...	.....do.....	Do.
1910	.....do.....	...do...	1,500.00	1,500.00	...do...	.....do.....	Do.
1910	.....do.....	...do...	1,500.00	1,500.00	...do...	.....do.....	Do.
1910	.....do.....	...do...	1,500.00	1,500.00	...do...	.....do.....	Do.
1910	.....do.....	...do...	1,500.00	1,500.00	...do...	.....do.....	Do.
1910	.....do.....	...do...	1,500.00	1,500.00	...do...	.....do.....	Do.
.....	.....	...do...	1,080.00	.....	Worthless.	Sioux City, Iowa..	Upper Missouri River.
.....	.....	...do...	625.00	.....	...do...	.....do.....	Do.
.....	.....	...do...	625.00	300.00	Fair...	Lower Missouri River.	Do.
.....	.....	...do...	999.25	.....	Worthless.	Sioux City, Iowa..	Do.
.....	.....	...do...	625.00	.....	...do...	.....do.....	Do.
.....	.....	...do...	840.00	200.00	Poor..	.....do.....	Do.
.....	.....	...do...	840.00	200.00	...do...	.....do.....	Do.
.....	.....	...do...	840.00	200.00	...do...	.....do.....	Do.
.....	.....	...do...	840.00	300.00	...do...	Lower Missouri River.	Do.
.....	.....	...do...	750.00	.....	Worthless.	Sioux City, Iowa..	Do.
.....	.....	...do...	840.00	500.00	Fair...	.....do.....	Do.
.....	.....	...do...	840.00	300.00	Poor..	Lower Missouri River.	Do.
.....	.....	...do...	720.00	200.00	...do...	Pierre, S. Dak.....	Do.
.....	.....	...do...	125.00	.....	Worthless.	Rockhaven, N. Dak.	Do.
.....	.....	...do...	950.00	300.00	Poor..	.....do.....	Do.
.....	.....	...do...	650.00	100.00	...do...	.....do.....	Do.
.....	.....	...do...	(a)	.....	Worthless.	.....do.....	Do.
.....	.....	...do...	2,575.00	.....	Unserviceable.	.....do.....	Do.
1906	Bismarck, N. Dak.	...do...	532.00	400.00	Fair...	.....do.....	Do.
1906	.....do.....	...do...	532.00	400.00	...do...	.....do.....	Do.
.....	.....	...do...	691.00	.....	Worthless.	Lower Missouri River.	Gasconade River
.....	.....	...do...	835.00	300.00	Fair...	.....do.....	Do.
.....	.....	...do...	835.00	300.00	...do...	.....do.....	Do.
.....	.....	...do...	937.00	700.00	...do...	Osage River.....	Osage River.
.....	.....	...do...	937.00	700.00	...do...	.....do.....	Do.
.....	.....	...do...	1,200.00	1,000.00	Good..	.....do.....	Do.
.....	.....	...do...	35.00	.....	Worthless.	Lower Missouri River.	Lower Missouri River.
1896	St. Louis, Mo....	...do...	35.00	.....	...do...	Gasconade River..	Gasconade River.
.....	.....	...do...	25.00	10.00	Fair...	Lower Missouri River.	Lower Missouri River.
.....	.....	...do...	25.00	5.00	Poor..	.....do.....	Do.
.....	.....	...do...	66.00	30.00	Fair...	.....do.....	Do.
.....	.....	...do...	66.00	30.00	...do...	.....do.....	Do.
.....	.....	...do...	32.00	32.00	Good..	.....do.....	Do.

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TABLE V.—*Statement of floating plant owned by the United States and*

KANSAS CITY, MO.—Continued.

Name or number.	Class and description.	Tonnage.	Dimensions.			Built.	
			Length.	Width.	Depth.	When.	Where.
			Ft. in.	Ft. in.	Ft. in.		
65	Skiff		20 0	4 4	1 6	1909	Gasconade, Mo.
66	do		16 0	4 0	1 4	1909	do.
67	do		20 0	4 7	1 6	1909	do.
68	do		20 0	4 7	1 6	1909	do.
69	do		20 0	4 7	1 6	1909	do.
70	do		20 0	4 7	1 6	1909	do.
71	do		20 0	4 7	1 6	1909	do.
72	do		20 0	4 4	1 6	1909	do.
73	do		20 0	4 7	1 6	1909	do.
74	do		20 0	4 4	1 6	1909	do.
75	do		20 0	4 4	1 6	1909	do.
76	do		20 0	4 4	1 6	1909	do.
I-S	do		20 0	4 7	1 5	1897	Sioux City, Iowa.
II-S	do		20 0	4 10	1 4	1897	do.
III-S	do		20 0	4 7	1 4	1897	do.
IV-S	do		23 0	4 10	1 4	1897	do.
I-B	do		18 0	4 4	1 7	1895	Stillwater, Minn.
101	do		18 0				do.
102	do		16 0				do.
McPherson No. 1	do		20 0	4 4	1 5	1891	Dubuque, Iowa.
McPherson No. 2	do		20 0	4 4	1 5	1899	Stillwater, Minn.
McPherson	Yawl		26 0	6 4	1 7	1895	Jeffersonville, Ind.
Missouri No. 3	do		26 0	5 9		1907	New York, N. Y.

LITTLE ROCK, ARK.

Arkansas	Steam stern wheel snagboat.	196.00	140	0	30	0	4	6	1900	Jeffersonville, Ind.
Quapaw (on docks rebuilding).	do	182.00	128	0	31	0	4	4	1902 1903	do. Little Rock, Ark.
C. B. Reese	do	364.00	172	0	37	0	4	8	1879	Carondelet, Mo.
Cleveland (condemned and dismantled).	Steam stern wheel towboat.	90.00	110	0	20	0	3	9	1903	Batesville, Ark.
A. D. Allen	do	86.00	125	0	23	0	4	5	[a]1901	Jeffersonville, Ind.
Van Frank	Dipper dredge	175.00	100	0	34	0	6	0	1904	Batesville, Ark.
A. B. Johnson	Hand propelled snagboat.	58.00	84	0	22	0	3	0	1904	Madison, Ark.
Riverside	do	58.00	84	0	22	0	3	0	1904	Poplar Bluff, Mo.
Barge, 7-07	Decked scow	170.00	100	0	20	0	5	0	1907	Batesville, Ark.
Barge, 8-07	do	170.00	100	0	20	0	5	0	1907	do.
Barge, 9-07	do	170.00	100	0	20	0	5	0	1907	do.
Barge, 10-07	do	170.00	100	0	20	0	5	0	1907	do.
Barge, 11-09	do	185.00	119	6	24	0	4	0	1907	Little Rock, Ark.
Derrick Boat No. 2	do	55.00	60	0	26	0	4	0	1901	Batesville, Ark.
Quarter Boat No. 1	Complete quarters	130.00	100	0	20	0	4	0	1908	do.
No name	Gasoline launch	3.00	25	0	4	6	2	6	1908	Grafton, Ill.

[a] Rebuilt 1907.

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employed in the Engineer Department at Large on June 30, 1910—Continued.

KANSAS CITY, MO.—Continued.

Purchased. When.	Purchased. Where.	Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
.....	.....	Wood.	$35.00	$35.00	Good..	Lower Missouri River.	Lower Missouri River.
.....	.....	...do...	32.00	32.00	...do...	.....do.....	Do.
.....	.....	...do...	37.00	37.00	...do...	.....do.....	Do.
.....	.....	...do...	37.00	37.00	...do...	.....do.....	Do.
.....	.....	...do...	37.00	37.00	...do...	.....do.....	Do.
.....	.....	...do...	37.00	37.00	...do...	.....do.....	Do.
.....	.....	...do...	37.00	37.00	...do...	.....do.....	Do.
.....	.....	...do...	35.00	35.00	...do...	.....do.....	Do.
.....	.....	...do...	35.00	35.00	...do...	.....do.....	Do.
.....	.....	...do...	35.00	35.00	...do...	.....do.....	Do.
.....	.....	...do...	35.00	35.00	...do...	.....do.....	Do.
.....	.....	...do...	35.00	35.00	...do...	.....do.....	Do.
.....	.....	...do...	40.00	.....	Worthless.	Sioux City, Iowa..	Upper Missouri River.
.....	.....	...do...	40.00	.....	...do...	.....do.....	Do.
.....	.....	...do...	40.00	10.00	Fair...	Lower Missouri River.	Do.
.....	.....	...do...	40.00	5.00	Poor..	Sioux City, Iowa..	Do.
1895	Stillwater, Minn.	...do...	45.00	.....	Worthless.	Rockhaven, N. Dak.	Do.
1910	Glendive, Mont.	...do...	28.00	28.00	Good..	Williston, N. Dak.	Do.
1910	.....do.....	...do...	24.00	24.00	...do...	.....do.....	Do.
1891	Dubuque, Iowa.	...do...	35.00	.....	Worthless.	Sioux City, Iowa..	Do.
1899	Stillwater, Minn.	...do...	42.00	15.00	Fair...	.....do.....	Do.
1895	Jeffersonville, Ind.	Steel..	160.00	40.00	...do...	With snag boat McPherson.	Do.
1907	New York, N. Y.	...do...	250.00	200.00	Good..	With snag boat Missouri.	Lower Missouri River.

LITTLE ROCK, ARK.

.....	.....	Steel..	$27,138.87	$12,000.00	Fair...	Arkansas River...	Little Rock, Arkansas district.
.....	.....	Wood.	15,000.00	5,000.00	.....	White, Black, and Current rivers.	Do.
.....	.....	Iron and steel.	72,325.00	17,500.00	Fair...	Arkansas and White rivers.	Do.
.....	.....	Wood.	4,500.00	.....	.....	.....do.....	Do.
1910	Little Rock, Ark	...do...	Unknown	6,200.00	Good..	Upper White River.	Do.
.....	.....	...do...	14,413.00	6,000.00	Fair...	.....do.....	Do.
.....	.....	...do...	2,731.26	1,750.00	...do...	St. Francis River..	Do.
.....	.....	...do...	2,900.00	1,750.00	...do...	Black and Current rivers.	Do.
.....	.....	...do...	1,917.00	1,000 00	...do...	Arkansas and White rivers.	Upper White River, Ark.
.....	.....	...do...	1,917.00	1,000.00	...do...	.....do.....	Do.
.....	.....	...do...	1,917.00	1,000.00	...do...	.....do.....	Do.
.....	.....	...do...	1,917.00	1,000.00	...do...	.....do.....	Do.
1909	Pine Bluff, Ark	...do...	1,750.00	1,000.00	...do...	.....do.....	Do.
.....	.....	...do...	[b] 1,065.00	700.00	...do...	.....do.....	Do.
.....	.....	...do...	4,217.00	3,300.00	...do...	.....do.....	Do.
1908	Grafton, Ill.....	Steel..	750.00	350.00	...do...	.....do.....	Little Rock, Arkansas district.

[b] Estimate of cost does not include machinery.

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TABLE V.—*Statement of floating plant owned by the United States and*

LOS ANGELES, CAL.

Name or number.	Class and description.	Tonnage.	Dimensions. Length.	Width.	Depth.	Built. When.	Where.
			Ft. in.	Ft. in.	Ft. in.		
San Pedro	20-inch suction dredge	400.00	140 8	40 8	10 7	1904	San Pedro, Cal.
Pedrito	16 horsepower gasoline launch.	8.00	30 0	7 0	3 4	1904	do.
No. 1	Barge	33.00	34 6	12 0	4 6	1905	do.
No. 2	do.	40.00	40 0	18 0	3 2	1872	do.
No. 3	do.	40.00	40 8	17 0	3 8	1872	do.
No. 4	do.	192.00	29 6	10 0	3 10	1904	do.
Nos. 8 and 9	do.	28.9	34 9	10 0	4 6	1904	do.
Nos. 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, and 38.	Pontoons	12.5	21 3	10 0	3 0	1904	do.
Nos. 11, 13, 15, 17, 19, 21, 23, 25, and 27.	do.	20.6	35 0	10 0	3 0	1904	do.
Nos. 29 and 31	do.	20.6	35 0	10 0	3 0	1905	do.
Nos. 33 and 35	do.	12.5	21 3	10 0	3 0	1905	do.
Nos. 7	Water boat	10.00	28 8	8 8	2 6	1888	do.

LOUISVILLE, KY.

Cherokee	Towboat	125.00	124	6	27	5	4	0	[b]1887	Jeffersonville, Ind.
Louisville	Dipper dredge	79.00	71	0	28	0	6	0	1886	Cincinnati, Ohio.
Casey	Combined hydraulic and dipper dredge.	110.00	87	0	28	0	7	0	1907	Louisville, Ky.
No. 2	Decked barge	100.00	72	0	22	0	4	6	1895	Leavenworth, Ind.
No. 16	do.	139.00	90	11½	24	6½	6	3	1908	Elizabeth, Pa.
No. 17	do.	139.00	90	11½	24	6½	6	3	1908	do.
No. 11	Mud dump scow	([d])	85	0	24	0	6	0	1905	do.
No. 12	do.	([d])	85	0	24	0	6	0	1905	do.
No. 13	do.	([d])	85	0	24	0	6	0	1905	do.
No. 14	do.	([d])	85	0	24	0	6	0	1905	do.
No. 15	do.	([d])	85	0	25	0	6	0	1909	Louisville, Ky.
No. 16	do.	([d])	85	0	25	0	6	0	1909	do.
No. 5	do.	([d])	85	0	24	0	6	0	1898	Elizabeth, Pa.
No. 6	do.	([d])	85	0	24	0	6	0	1898	do.
No. 9	do.	([d])	85	0	24	0	6	0	1902	do.
No. 10	do.	([d])	85	0	24	0	6	0	1902	do.
No. 4	Decked barge	100.00	72	0	22	0	4	0	1900	Leavenworth, Ind.
No. 5	Derrick boat	100.00	72	0	22	0	4	0	1899	Louisville, Ky.
No. 7	Decked barge	15.00	40	0	12	0	2	2	1898	do.
No. 10	do.	100.00	80	0	16	0	3	4	1898	do.
No. 11	do.	15.00	40	0	12	0	2	2	1904	do.
No. 13	do.	15.00	40	0	12	0	2	2	1904	do.
No. 14	do.	70.00	60	0	18	0	3	0	1908	do.
No. 15	do.	70.00	60	0	18	0	3	0	1908	do.
Wave Rock	Towboat	15.00	47	0	14	0	2	1	1898	do.
Wabash	Dipper dredge	140.00	80	0	26	0	6	9	1900	do.
Mammoth Cave	Snag and tow boat	200.00	124	0	32	0	5	0	1908	Jeffersonville, Ind.
Shawnee	Towboat	83.00	119	0	25	0	3	6	[1897 [1909	do. Louisville, Ky.
Emerald	do.	15.00	65	0	14	0	2	2	1899	Cincinnati, Ohio.
Green River	Dipper dredge	156.00	112	0	31	0	4	0	1896	Spottsville, Ky.
No. 1	Derrick boat	71.00	70	0	26	0	4	0	1896	do.
No. 2	do.	71.00	70	0	26	0	4	0	1896	do.
No. 3	do.	71.00	70	0	26	0	4	0	1906	Green Castle, Ky.

[a] Each.
[b] Rebuilt at Louisville, Ky., 1896.
[c] Built by United States.
[d] Capacity 100 cubic yards.

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employed in the Engineer Department at Large on June 30, 1910—Continued.

LOS ANGELES, CAL.

Purchased. When.	Purchased. Where.	Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
.....	.....	Wood.	$98,400.00	$53,136.00	Good..	Los Angeles Harbor, Cal.	Improving harbor at Wilmington, Cal.
.....	.....	...do...	1,732.50	935.00	...do...	.....do.....	Do.
.....	.....	...do...	373.25	235.00	...do...	.....do.....	Do.
.....	.....	...do...	750.00	16.00	Bad...	.....do.....	Do.
.....	.....	...do...	750.00	16.00	...do...	.....do.....	Do.
.....	.....	...do...	377.70	205.00	Good..	.....do.....	Do.
.....	.....	...do...	a 297.44	160.00	...do...	.....do.....	Do.
.....	.....	...do...	a 192.87	104.00	...do...	.....do.....	Do.
.....	.....	...do...	a 292.78	158.00	...do...	.....do.....	Do.
.....	.....	...do...	a 317.85	201.00	...do...	.....do.....	Do.
.....	.....	...do...	a 223.70	141.00	...do...	.....do.....	Do.
.....	.....	...do...	a 400.00	8.00	Bad...	.....do.....	Do.

LOUISVILLE, KY.

1887	Jeffersonville, Ind.	Wood and iron.	$16,669.00	$6,700.00	Poor..	Louisville, Ky....	Louisville and Portland Canal.
1886	Cincinnati, Ohio	Iron hull.	25,000.00	5,700.00	Fair...	.....do.....	Do.
.....	(e)	Wood.	15,257.13	11,500.00	...do...	.....do.....	Do.
1895	Leavenworth, Ind.	...do...	590.00	25.00	Poor..	.....do.....	Do.
1908	Elizabeth, Pa...	Steel, wood deck.	7,067.19	7,067.19	Good..	.....do.....	Do.
1908	.....do.....	...do..	7,067.19	7,067.19	...do ..	.....do	Do.
1905	.....do.....	Wood.	3,394.00	2,100.00	Fair...	.....do.....	Do.
1905	.....do.....	...do...	3,394.00	2,100.00	...do...	.....do.....	Do.
1905	.....do.....	...do...	3,394.00	2,100.00	...do...	.....do.....	Do.
1905	.....do.....	...do...	3,394.00	2,100.00	...do...	.....do.....	Do.
.....	(e)	...do...	3,140.72	3,140.72	Good..	.....do.....	Do.
.....	(e)	...do...	3,140.72	3,140.72	...do...	.....do.....	Do.
1898	Elizabeth, Pa...	...do...	2,300.00	.....	Worthless.	.....do.....	Falls of Ohio River, Louisville, Ky.
1898	.....do.....	...do...	2,300.00	300.00	Poor..	.....do.....	Do.
1903	.....do.....	...do...	2,967.00	1,600.00	Fair...	.....do.....	Do.
1903	.....do.....	...do...	2,967.00	1,600.00	...do...	.....do.....	Do.
1900	Leavenworth, Ind.	Wood.	670.00	240.00	Poor..	Louisville, Ky....	Falls of Ohio River, Louisville, Ky.
.....	(e)	...do ..	3,588.98	1,900.00	...do ..	.....do.....	Do.
.....	(e)	...do ..	280.00	15.00	...do ..	.....do.....	Do.
.....	(e)	...do ..	1,237.00	50.00	...do ..	.....do.....	Do.
.....	(e)	...do ..	213.95	90.00	...do ..	.....do.....	Do.
.....	(e)	...do ..	213.94	90.00	...do ..	.....do.....	Do.
.....	(e)	...do ..	818.76	650.00	Fair...	.....do.....	Do.
.....	(e)	...do ..	818.77	650.00	...do ..	.....do.....	Do.
.....	(e)	...do ..	2,066.00	1,000.00	Poor..	.....do.....	Do.
.....	(e)	...do ..	8,526.00	4,000.00	Fair...	.....do.....	Wabash River, Ind. and Ill.
1908	Jeffersonville, Ind.	St. hull, wood sup.	36,845.19	40,000.00	Good..	Green and Barren rivers.	Green and Barren rivers, Ky.
.....	(e)	Wood.	8,461.21	10,000.00	...do ..	.....do.....	Do.
1899	Cincinnati, Ohio.	...do ..	2,975.00	1,500.00	Fair...	Louisville, Ky....	Do.
.....	(f)	...do ..	4,093.69	6,500.00	Good..	Green and Barren rivers.	Do.
.....	(e)	...do ..	1,964.35	600.00	Poor..	.....do.....	Do.
.....	(e)	...do ..	1,964.35	600.00	...do ..	.....do.....	Do.
.....	(e)	...do ..	2,520.52	2,200.00	Good..	.....do.....	Rough River, Ky.

a Rebuilt by United States.

f Rebuilt by United States; hull repaired 1908.

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TABLE V.—*Statement of floating plant owned by the United States and*

LOUISVILLE, KY.—Continued.

Name or number.	Class and description.	Tonnage.	Dimensions.			Built.	
			Length.	Width.	Depth.	When.	Where.
			Ft. in.	Ft. in.	Ft. in.		
No. 1	Decked barge	220.00	100 0	20 0	5 0	1896	Spottsville, Ky.
No. 2	do	220.00	100 0	20 0	5 0	1896	do.
No. 3	do	275.00	100 0	22 0	6 0	1907	Louisville, Ky.
No. 4	do	275.00	100 0	22 0	6 0	1907	do.
Quarter boat	House and office boat	120.00	76 0	24 0	3 6	1899	Glenmore, Ky.
No. 1 (old)	Mud dump scow	(b)	70 0	21 0	5 6	1902	Elizabeth, Pa.
No. 2 (old)	do	(b)	70 0	21 0	5 6	1902	do.
No. 1 (new)	do	(b)	70 0	21 0	5 6	1910	Louisville, Ky.
No. 2 (new)	do	(b)	70 0	21 0	5 6	1910	do.
No. 1	Drill boat	20.00	40 0	14 0	3 0	1909	do.
No. 2	do	20.00	40 0	14 0	3 0	1909	do.
No. 3	do	20.00	40 0	14 0	3 0	1909	do.
No. 4	do	20.00	40 0	14 0	3 0	1909	do.
No. 5	Fuel boat	20.00	40 0	14 0	3 0	1909	do.
No. 6	do	20.00	40 0	14 0	3 0	1909	do.
Quarter boat, No. 1	Office and house boat	100.00	110 0	22 0	3 5	1909	Parkersburg, W. Va.
Quarter boat, No. 2	do	200.00	124 0	32 0	5 0	1909	Louisville, Ky.

MANILA, P. I.

Engineer	Steam tug	157.00	106 0	20 0	11 0	1907	Hongkong.
San Pedro	do	112.87	92 10½	20 10	10 6	1890	England.
No. 2	Deck barge	100.00	75 0	26 2	7 8½	1905	Sisiman.
No. 3	do	100.00	75 0	26 2	7 8½	1907	Manila.
No. 4	do	100.00	75 0	26 2	7 8½	1907	do.
No. 5	do	105.70	75 6	28 6	7 0	1905	Iloilo, U. S. Engineer Department.
No. 6	do	68.00	58 0	20 0	6 0	1908	Corregidor Island.
No. 7	do	200.00	110 0	30 0	8 0	1909	Manila.
No. 8	do	200.00	110 0	30 0	8 0	1910	do.
No. 9	do	200.00	110 0	30 0	8 0	1910	do.
No. 1 D	do	105.70	75 6	28 6	7 0	1905	Iloilo.
No. 2	Derrick scow	122.50	74 0	36 0	6 0	1909	Manila.
No. 1	Water barge	65.00	55 0	20 0	5 0	1909	Navy, Cavite.

MEMPHIS, TENN.

2	Model barges	300.00	136 6	29 0	5 0	1894	Jeffersonville, Ind.
2	Decked barges	350.00	120 0	30 0	6 0	1893	Elizabeth, Pa.
6	do	350.00	120 0	30 0	6 0	1893	Madison, Ind.
3	do	350.00	120 0	30 0	6 0	1893	Levanna, Ohio.
2	do	350.00	120 0	30 0	6 0	1893	Madison, Ind.
3	do	350.00	120 0	30 0	6 0	1893	Elizabeth, Pa.
2	do	350.00	120 0	30 0	6 0	1905	Government fleet, Memphis.
1	do	350.00	120 0	30 0	6 0	1893	Elizabeth, Pa.
2	do	400.00	120 0	30 0	7 0	1908	Government fleet, Memphis.
4	do	400.00	120 0	30 0	7 0	1908	do.
5	do	400.00	120 0	30 0	7 0	1908	Gulfport, Miss.
2	do	400.00	120 0	30 0	7 0	1909	do.
2	Mattress barges	(f)	145 0	32 0	6 0	1893	Elizabeth, Pa.
2	do	(f)	144 0	32 0	5 0	1907	Government fleet, Memphis.
2	do	350.00	120 0	30 0	6 0	1893	Levanna, Ohio.

[a] Built by United States.
[b] Capacity, 100 cubic yards.
[c] Built by United States on hull of dismantled snagboat.
[d] Each.

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employed in the Engineer Department at Large on June 30, 1910—Continued.

LOUISVILLE, KY.—Continued.

Purchased. When.	Purchased. Where.	Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
.....	(a)	Wood.	$1,911.51	$1,400.00	Good..	Green and Barren rivers.	Green and Barren rivers, Ky.
.....	(a)	...do..	1,911.51	1,400.00	...do..	.....do.....	Do.
.....	(a)	...do..	2,614.05	2,200.00	...do..	.....do.....	Do.
.....	(a)	...do..	2,614.05	2,200.00	...do..	.....do.....	Do.
.....	(a)	...do..	2,200.00	600.00	...do..	.....do.....	Do.
1902	Elizabeth, Pa...	...do..	3,067.00	.....	Worthless.	.....do.....	Do.
1902	.....do.....	...do..	3,067.00	.....	...do..	.....do.....	Do.
.....	(a)	...do..	3,375.00	3,300.00	Good..	.....do.....	Do.
.....	(a)	...do..	3,375.00	3,300.00	...do..	.....do.....	Do.
.....	(a)	...do..	396.11	375.00	...do..	Ohio River survey	Survey of Ohio River.
.....	(a)	...do..	396.11	375.00	...do..	.....do.....	Do.
.....	(a)	...do..	396.11	375.00	...do..	.....do.....	Do.
.....	(a)	...do..	396.11	375.00	...do..	.....do.....	Do.
.....	(a)	...do..	396.11	375.00	...do..	.....do.....	Do.
.....	(a)	...do..	396.11	375.00	...do..	.....do.....	Do.
1909	Parkersburg, W. Va.	...do..	3,825.00	3,800.00	...do..	.....do.....	Do.
.....	(c)	Wood and iron.	1,128.63	1,600.00	Fair...	.....do.....	Do.

MANILA, P. I.

1908	Hongkong.....	Steel..	$44,811.47	$40,000.00	Good..	.....	
1909	Manila.....	...do...	18,900.00	25,000.00	...do...	.....	
1905	.....do.....	Wood.	3,324.00	1,000.00	Fair...	.....	
1907	.....do.....	...do...	4,372.00	2,000.00	Good..	.....	
1907	.....do.....	...do...	4,372.00	2,000.00	...do...	.....	
1907	.....do.....	...do...	3,000.00	2,000.00	...do...	.....	
.....	.....	...do...	2,500.00	1,000.00	Fair...	Manila and Subic bays.	Defensive works, Philippine Islands.
1909	Manila.....	...do...	8,069.00	8,000.00	Good..	.....	
1910	.....do.....	...do...	8,069.00	8,000.00	...do...	.....	
1910	.....do.....	...do...	8,370.00	8,300.00	...do...	.....	
1909	.....do.....	...do...	3,000.00	2,000.00	...do...	.....	
1909	.....do.....	...do...	6,770.00	6,500.00	...do...	.....	
1909	Cavite.....	...do...	3,142.29	3,000.00	...do...	.....	

MEMPHIS, TENN.

.....	.....	Wood.	d $3,750.00	d $696.00	Poor..	Mississippi River, First and Second districts.	Improving Mississippi River, First and Second districts.
.....	.....	...do...	d 3,100.00	d 1,241.00	Fair...	.....do.....	Do.
.....	.....	...do...	d 3,170.00	d 965.00	Poor...	.....do.....	Do.
.....	.....	...do...	d 2,800.00	d 1,331.00	Fair...	.....do.....	Do.
.....	.....	...do...	d 3,170.00	d 837.00	...do...	.....do.....	Do.
.....	.....	...do...	d 3,100.00	d 1,541.00	Good..	.....do.....	Do.
.....	.....	...do...	d 3,370.00	d 1,716.00	...do...	.....do.....	Do.
.....	.....	...do...	3,170.00	2,075.00	...do...	.....do.....	Do.
.....	.....	...do...	d 3,581.50	d 2,354.00	...do...	.....do.....	Do.
.....	.....	(e)	d 5,624.70	d 4,312.00	...do...	.....do.....	Do.
.....	.....	(e)	d 5,200.00	d 4,466.00	...do...	.....do.....	Do.
.....	.....	(e)	d 5,044.06	d 4,867.00	...do...	.....do.....	Do.
.....	.....	Wood.	d 4,530.00	d 365.00	Poor..	.....do.....	Do.
.....	.....	...do...	d 5,120.00	d 4,223.00	Good..	.....do.....	Do.
.....	.....	...do...	d 2,800.00	d 3,893.00	...do...	.....do.....	Do.

e Creosoted wood. f Nominal.

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TABLE V.—*Statement of floating plant owned by the United States and*

MEMPHIS, TENN.—Continued.

Name or number.	Class and description.	Tonnage.	Dimensions. Length.	Width.	Depth.	Built. When.	Where.
			Ft. in.	*Ft. in.*	*Ft. in.*		
2	Mooring barges	280.00	120 0	25 0	5 0	1890	Government fleet, Memphis.
2	....do	300.00	136 6	29 0	5 0	1894	Jeffersonville, Ind.
1	Flatboat	(b)	45 0	15 0	3 0	1893	Elizabeth, Pa.
1	....do	(b)	50 0	15 0	3 0	1893	U. S. fleet, Memphis.
1	....do	(b)	50 0	15 0	3 0	1904	....do.
1	....do	(b)	40 0	12 0	3 0	1906	....do.
Wolf	Dredge	(b)	80 0	28 0	4 6	1897	Madison, Ind.
2	Dump scows	120.00	75 0	20 6	5 6	1900	U. S. fleet, Memphis.
1	Derrick boat	(b)	75 0	30 0	5 0	1905	....do.
Nos. 8, 11, and 12	Quarter boats	(b)	135 0	25 0	8 0	1882 to 1884	....do.
Nos. 25 and 26	....do	(b)	135 0	25 0	8 0		....do.
No. 27	....do	(b)	90 6	18 6	3 0	1882	Ohio River.
No. 29	....do	(b)	90 6	18 6	3 0	1882	....do.
Nos. 206 and 221	....do	350.00	120 0	30 0	6 0	1894	U. S. fleet, Memphis.
No. 0601	....do	(b)	68 0	18 0	4 0	1906	....do.
No. 2	Hydraulic grader	(b)	110 0	30 0	5 0	1882	New Albany, Ind.
No. 9313	....do	350.00	120 0	30 0	4 0	1903	U. S. fleet, Memphis.
1	Floating dock	(b)	145 0	36 0	10 0	1889	....do.
No. 1	Machine-shop boat	(b)	132 0	24 0	8 0	1882	New Albany, Ind.
Minnetonka	Steam towboat	381.63	176 5	29 9	5 4	1883	Jeffersonville, Ind.
Chisca	....do	260.00	160 0	30 0	6 0	1897	....do.
Titan	....do	210.25	142 0	27 0	6 0	1899	Madison, Ind.
Graham	....do	102.93	118 0	21 0	3 0	1879	Pittsburg, Pa.
Itasca	....do	45.27	76 0	15 0	5 0	1882	Carondolet, Mo.
W. M. Rees	Steamboat	(b)	81 0	12 0	4 0	1887	....do.
Titania	Motor boat	(b)	27 0	4 0	2 0	1909	U. S. fleet, Memphis.
2	Pile drivers c	(b)	70 0	20 0	3 0	.....	.....

MILWAUKEE, WIS.

Floating derrick No. 1	Flat scow	95.00	66	6	29	6	5	10	1903	Milwaukee, Wis.
Floating derrick No. 2	....do	125.00	84	2	27	4	6	8	1908	Sturgeon Bay, Wis.
No. 1	Steam dipper dredge	150.00	78	6	31	4	7	2	1872	Chicago, Ill.
No. 5	Center-dump scow	95.00	78	0	22	0	8	0	1900	Kewaunee, Wis.
No. 6	....do	95.00	78	0	22	0	8	0	1900	....do.
No. 1	Flat scow	54.00	60	0	20	0	4	4	1897	....do.
No. 2	....do	138.00	78	0	22	0	8	0	1896	Sheboygan, Wis.
No. 4	....do	138.00	78	0	22	0	8	0	1898	Kewaunee, Wis.
Floating pile driver No. 1	....do	94.00	67	10	21	4	6	6	1894	Sheboygan, Wis.
Floating pile driver No. 2	....do	100.00	60	0	25	4	6	6	1906	Sturgeon Bay, Wis.
Ariadne	Steam launch	8.00	40	0	9	0	4	8	1899	Manitowoc, Wis.
Inspector	....do	12.00	50	0	8	9	4	8	1903	Racine, Wis.
No. 1	Gasoline launch (16 horsepower).	8.00	35	0	9	0	3	9	1907	Two Rivers, Wis.
No. 3	....do	8.00	35	0	9	0	4	0	1908	....do.
No. 2	Gasoline launch (45 horsepower).	10.00	40	0	10	0	4	4	1908	....do.
Industry	Propellor steam tug	28.63	62.6	0	16	0	8	6	1890	Manitowoc, Wis.
Manitowoc f	Survey steamer	190.00	100	0	20	0	10	6	1909	Manitowoc, Wis.
Fox	Side-wheel steam tug	100.00	106	0	30	0	5	0	1900	Oshkosh, Wis.
Wolf	....do	80.00	89	0	30	0	4	6	1900	....do.
Quarter boat No. 1	Accommodations for 50 persons.	45.00	90	0	20	0	4	0	1875	Dubuque, Iowa.
No. 4	Steam dipper dredge	112.00	90	0	32	0	7	0	1872	....do.

a Each.
b Nominal.
c Transferred from St. Louis engineer office.
d Repaired in 1897.
e Repaired in 1910; 45-horsepower engine substituted for 24-horsepower engine.

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employed by the Engineer Department at Large on June 30, 1910—Continued.

MEMPHIS, TENN.—Continued.

Purchased. When.	Purchased. Where.	Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
.....	.....	Wood.	a $2,023.00	a $3,654.00	Good .	Mississippi River, First and Second districts.	Improving Mississippi River, First and Second districts.
.....	.....	...do...	a 3,750.00	a 2,912.00	Good..	.....do.....	Do.
.....	.....	...do...	450.00	225.00	Fair...	.....do.....	Do.
.....	.....	...do...	410.00	386.00	Good..	.....do.....	Do.
.....	.....	...do...	496.00	191.00	Poor..	.....do.....	Do.
.....	.....	...do...	460.50	337.00	Good..	.....do.....	Do.
1898	Memphis, Tenn.	...do...	8,000.00	2,494.00	Poor..	.....do.....	Do.
.....	.....	...do...	a 3,286.00	a 1,063.00	...do...	.....do.....	Do.
.....	.....	...do...	2,956.00	3,234.00	Fair...	.....do.....	Do.
.....	.....	...do...	a 3,645.00	a 1,038.00	...do...	.....do.....	Do.
.....	.....	...do...	a 3,645.00	a 3,510.00	...do...	.....do.....	Do.
.....	.....	...do...	2,788.00	3,525.00	Good..	.....do.....	Do.
.....	.....	...do...	2,741.00	2,435.00	Fair...	.....do.....	Do.
.....	.....	...do...	a 4,900.00	a 4,200.00	Good..	.....do.....	Do.
.....	.....	...do...	3,059.00	2,857.00	...do...	.....do.....	Do.
.....	.....	...do...	30,232.00	5,595.00	...do...	.....do.....	Do.
.....	.....	...do...	3,823.00	5,286.00	...do...	.....do.....	Do.
.....	.....	...do...	9,475.00	6,101.00	...do...	.....do.....	Do.
.....	.....	...do...	8,501.00	3,513.00	Fair...	.....do.....	Do.
1884	St. Louis, Mo...	...do...	40,000.00	15,853.00	Poor...	.....do.....	Do.
.....	.....	...do...	25,900.00	22,176.00	Good..	.....do.....	Do.
.....	.....	...do...	23,500.00	26,083.00	...do...	.....do.....	Do.
1884	Pittsburg, Pa...	...do...	9,500.00	12,571.00	Fair...	.....do.....	Do.
.....	.....	Iron...	9,500.00	4,716.00	Good..	.....do.....	Do.
.....	.....	Wood.	5,330.00	6,471.00	...do...	.....do.....	Do.
.....	.....	...do...	1,000.00	790.00	...do...	.....do.....	Do.
.....	.....	...do...	a 4,435.00	a 3,362.00	Fair...	.....do.....	Do.

MILWAUKEE, WIS.

1905	Milwaukee, Wis.	Wood.	$2,000.00	d $1,800.00	Good..	Sturgeon Bay Canal, Wis.	Harbors on west shore of Lake Michigan and Green Bay, Wis.
1908	Sturgeon Bay, Wis.	...do...	5,625.00	5,100.00	...do...	Manitowoc, Wis...	Do.
.....	.....	...do...	29,500.00	11,500.00	Fair...	Port Washington, Wis.	Do.
.....	.....	...do...	4,260.00	2,500.00	...do...	.....do.....	Do.
.....	.....	...do...	4,260.00	2,500.00	...do...	.....do.....	Do.
1899	Kewaunee, Wis.	...do...	350.00	100.00	Poor..	Sturgeon Bay Canal, Wis.	Do.
.....	.....	...do...	3,300.00	1,100.00	...do...	Manitowoc, Wis...	Do.
.....	.....	...do...	3,943.00	1,800.00	Fair...	Kewaunee, Wis...	Do.
1896	Sheboygan, Wis.	...do...	3,450.00	1,450.00	Poor..	Manitowoc, Wis...	Do.
1906	Waukegan, Ill...	...do...	4,840.00	4,000.00	Good..	Sturgeon Bay Canal, Wis.	Do.
1899	Manitowoc, Wis.	...do...	2,400.00	1,700.00	...do...	.....do.....	Do.
1903	Racine, Wis.....	Steel..	5,000.00	1,900.00	Fair...	Milwaukee, Wis...	Do.
1907	Two Rivers, Wis.	Wood.	1,090.00	700.00	...do...	Manitowoc, Wis...	Do.
1908	.....do.....	...do...	1,540.00	1,400.00	Good..	Milwaukee, Wis...	Do.
1908	.....do.....	...do...	1,960.00	e 2,500.00	...do...	Manitowoc, Wis...	Do.
1899	Menominee, Mich.	...do...	5,000.00	4,000.00	Fair...	Port Washington, Wis.	Do.
1909	Manitowoc, Wis.	Steel..	39,000.00	39,000.00	Good..	.....	Do.
.....	.....	Wood.	7,135.00	4,470.00	...do..	Fox River, Wis...	Fox River improvement.
.....	.....	...do..	7,675.00	4,810.00	...do..	.....do.....	Do.
.....	.....	...do..	2,000.00	310.00	Poor..	.....do.....	Do.
1876	Berlin, Wis.....	...do..	13,000.00	9,430.00	Good..	.....do.....	Do.

/ Name changed from steamer Engineer to Manitowoc by request of Chief of Engineers in letter of July 14, 1909.

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TABLE V.—*Statement of floating plant owned by the United States and*

MILWAUKEE, WIS.—Continued.

Name or number.	Class and description.	Tonnage.	Dimensions.			Built.	
			Length.	Width.	Depth.	When.	Where.
			Ft. in.	Ft. in.	Ft. in.		
No. 5	Steam grapple dredge	160.00	100 0	30 0	6 0	1878	Portage, Wis.
Conveyer dredge	Steam elevator	147.00	75 0	31 0	6 0	1905	Green Bay, Wis.
Delivery scow	Flat with conveyer, steel superstructure.	25.00	31 4	a16 4 b33 4	2 0 4 0	1905	do.
Intermediate scow, No. 1.	Flat with conveyer, wood superstructure.	20.00	40 0	16 0	3 0	1905	do.
Intermediate scow, No. 2.	do.	20.00	40 0	16 0	3 0	1905	do.
Berlin	Barge	63.00	81 2	18 6	4 2	1906	Oshkosh, Wis.
Eureka	Flat scow	78.00	70 0	18 0	4 0	1898	do.
Eureka, No. 2	do.	78.00	70 0	18 0	4 0	1910	Kaukauna, Wis.
Montello	Barge	63.00	80 0	18 0	4 0	1908	Green Bay, Wis.
Princeton	do.	250.00	90 0	22 0	6 0	1890	Oshkosh, Wis.
No. 1	Side-dump scow	113.00	70 6	18 0	5 2	1907	do.
No. 2	do.	113.00	70 6	18 0	5 2	1907	do.
No. 3	Flat scow with derrick	120.00	80 0	20 0	4 9	1901	do.
No. 4	do.	120.00	80 0	20 0	4 9	1901	do.
No. 5	Flat scow	40.00	50 0	16 0	3 0	1904	do.
No. 6	do.	40.00	50 0	16 0	3 0	1903	do.
No. 1	Open scow	3.00	18 0	5 0	1 10	1899	Kaukauna, Wis.
No. 4	do.	3.00	18 0	5 6	1 8	1897	Oshkosh, Wis.
No. 5	do.	1.50	14 0	4 0	1 8	1906	Kaukauna, Wis.
No. 1	Pontoon scow	36.00	40 0	14 4	3 4	1896	Oshkosh, Wis.
No. 2	do.	36.00	40 0	14 5	3 2	1908	Kaukauna, Wis.
No. 3	do.	36.00	40 0	14 5	3 2	1908	do.
No. 4	do.	36.00	40 0	14 5	3 2	1910	do.
Work scow	Flat scow	5.00	30 0	10 0	2 8	1909	do.

MOBILE, ALA.

Chickasaw	Steam propeller	131.47	108 0	18 0	8 0	1908	Pensacola navy-yard.
Tuscaloosa	Steam tug	70.97	89 0	21 8	7 3	1908	Scranton, Miss.
C. Donovan	do.	134.00	98 0	19 0	8 4	1895	Newport News, Va.
Charleston	Pump dredge	517.00	122 6	30 0	12 0	1891	Brooklyn, N. Y.
Barnard	Hydraulic dredge	754.00	206 2	38 0	14 6	1904	Camden, N. J.
Pascagoula	do.	348.81	150 0	40 0	9 6	1909	Baltimore, Md.
Black Warrior	Stern-wheel snag boat	200.00	152 0	32 0	4 0	1891	Mobile, Ala.
Nugent	Stern-wheel towboat	97.00	120 0	24 0	3 6	1904	Jeffersonville, Ind.
R. C. McCalla	Stern-wheel snag boat	98.00	100 0	28 0	5 0	1909	do.
Tombigbee	do.	97.67	100 0	28 0	4 6	1909	do.
Pearl	do.	60.00	82 0	26 0	5 0	1903	Mobile, Ala.
Demopolis	Nonpropelling steam capstan snag boat.	50.00	82 0	25 0	4 0	1891	do.
Vienna	Same, except hand capstan.	35.00	80 0	21 0	2 7	1890	Scranton, Miss.
Hattiesburg	Quarter boat	7.30	36 0	18 0	2 2	1910	Hattiesburg, Miss.
Sylph	Gasoline towboat	26.00	72 0	16 0	2 9	1900	Demopolis, Ala.
Mamie K	Gasoline launch	3.25	25 0	6 0	2 7	1892	New York, N. Y.

a Forward. b Aft.

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employed in the Engineer Department at Large on June 30, 1910—Continued.

MILWAUKEE, WIS.—Continued.

Purchased. When.	Purchased. Where.	Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
.....	.....	Wood.	$5,500.00	$4,960.00	Good.	Fox River, Wis...	Fox River improvement.
.....	.....	...do..	27,500.00	22,390.00	...do..	.....do.....	Do.
.....	.....	...do..	5,000.00	4,970.00	...do..	.....do.....	Do.
.....	.....	...do..	3,250.00	2,650.00	...do..	.....do.....	Do.
.....	.....	...do..	3,250.00	2,650.00	...do..	.....do.....	Do.
.....	.....	...do..	2,075.00	1,690.00	...do..	.....do.....	Do.
.....	.....	...do..	956.00	235.00	Poor..	.....do.....	Do.
.....	.....	...do..	1,555.00	1,555.00	Good..	.....do.....	Do.
.....	.....	...do..	2,014.00	1,820.00	...do..	.....do.....	Do.
.....	.....	...do..	2,000.00	320.00	Fair...	.....do.....	Do.
.....	.....	...do..	2,950.00	2,580.00	Good..	.....do.....	Do.
.....	.....	...do..	2,950.00	2,580.00	...do..	.....do.....	Do.
.....	.....	...do..	2,000.00	815.00	...do..	.....do.....	Do.
.....	.....	...do..	2,000.00	815.00	...do..	.....do.....	Do.
.....	.....	...do..	890.00	425.00	...do..	.....do.....	Do.
.....	.....	...do..	890.00	425.00	...do..	.....do.....	Do.
.....	.....	...do..	50.00	15.00	Fair...	.....do.....	Do.
.....	.....	...do..	23.00	7.00	Unserviceable.	.....do.....	Do.
.....	.....	...do..	27.42	25.00	Fair...	.....do.....	Do.
.....	.....	...do..	560.00	75.00	Unserviceable.		
.....	.....	...do..	876.71	790.00	Good..	.....do.....	Do.
.....	.....	...do..	876.71	790.00	...do..	.....do.....	Do.
.....	.....	...do..	720.70	720.00	...do..	.....do.....	Do.
.....	.....	...do..	86.71	85.00	...do..	.....do.....	Do.

MOBILE, ALA.

.....	.....	Steel..	$27,500.00	$24,000.00	Good..	Mobile Harbor, Ala.	General work, Mobile Harbor, Ala.
1908	Mobile, Ala.....	Wood.	21,500.00	21,500.00	...do..	In New Orleans district.	Harbors on coast of Mississippi.
1905	New Orleans, La.	Steel..	29,000.00	22,500.00	...do..	Gulfport Harbor, Miss.	New Orleans, La., district.
.....	.....	Wood.	111,515.68	47,000.00	...do..	Ship Island Pass, Miss.	Charleston, S. C., district.
.....	.....	Steel..	230,000.00	150,000.00	...do..	Gulfport Harbor, Miss.	New Orleans, La., district.
.....	.....	...do..	143,500.00	140,000.00	...do..	Pascagoula River, Miss.	Harbors on coast of Mississippi.
.....	.....	Wood.	28,000.00	5,500.00	Fair...	Pearl River, Miss.	Tombigbee River, Ala.
1905	Louisville, Ky..	...do..	19,000.00	15,000.00	Good..	Black Warrior River.	Black Warrior and Tombigbee rivers.
.....	.....	...do..	19,000.00	17,000.00	...do..	.....do.....	Do.
.....	.....	...do..	19,000.00	19,000.00	...do..	Tombigbee River, Ala.	Tombigbee River, Ala.
.....	.....	...do..	3,250.00	8,500.00	...do..	Pearl River, Miss..	Pearl River, Miss.
.....	.....	...do..	4,087.00	2,500.00	...do..	Pascagoula River, Miss.	Tombigbee River, Ala.
.....	.....	...do..	1,835.00	50.00	Unserviceable.	Tombigbee River.	Do.
.....	.....	...do..	951.00	900.00	Good..	Leaf River, Miss..	Leaf and Pascagoula rivers, Miss.
1906	Demopolis, Ala.	...do..	2,500.00	3,200.00	...do..	Black Warrior River.	Black Warrior and Tombigbee rivers.
1893	Mobile, Ala.....	...do..	1,000.00	400.00	Fair...	.....do.....	Do.

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TABLE V.—*Statement of floating plant owned by the United States and*

MOBILE, ALA.—Continued.

Name or number.	Class and description.	Tonnage.	Dimensions.			Built.	
			Length.	Width.	Depth.	When.	Where.
			Ft. in.	Ft. in.	Ft. in.		
Wolf	Gasoline launch	4.00	36 5	9 5	2 5	1907	Mobile, Ala.
Leaf	do	3.00	32 0	7 6	2 6	1907	Morris Heights, N. Y.
Jordan	do	2.92	32 0	11 0	2 6	1905	Scranton, Miss.
Biloxi	do	3.19	40 0	11 0	4 7	1909	Gulfport, Miss.
No name	Quarter boat	50.00	45 0	24 0	5 0	1904	Tuscaloosa, Ala.
No name	do	36.00	60 0	20 0	3 4	1904	do
No name	Derrick boat	44.00	42 6	32 0	3 6	1900	do
Humphreys	Pump dredge	194.00	100 0	32 0	8 9	1908	Mobile, Ala.
No. 1	Barge	90.00	90 0	24 0	5 0	1902	Tuscaloosa, Ala.
No. 2	do	100.00	89 8	24 2	6 1	1902	do
No. 3	do	90.00	90 0	24 0	5 0	1902	do
No. 4	do	90.00	90 0	24 0	5 0	1902	do
No. 5	do	90.00	90 0	24 0	5 0	1902	do
No. 6	Dredge boat	90.00	90 0	24 0	5 0	1903	do
No. 7	Barge	100.00	78 0	25 0	6 0	1904	Mobile, Ala.
No. 8	do	100.00	72 6	25 5	5 0	1904	do
No. 9	do	115.00	78 0	25 0	6 4	1904	do
No. 10	do	100.00	70 0	25 0	5 9	1904	do
No. 11	do	60.00	60 5	22 0	5 3	1904	Scranton, Miss.
No. 12	do	90.00	90 0	24 0	5 0	1905	Tuscaloosa, Ala.
No. 13	do	90.00	90 0	24 0	5 0	1905	do
No. 14	do	90.00	90 0	24 0	5 0	1906	do
No. 15	do	103.00	90 5	24 1	6 1	1906	do
No. 16	do	120.00	80 6	27 8	7 0	1905	Mobile, Ala.
No. 17	do	80.00	71 0	24 0	6 0	1905	Scranton, Miss.
No. 18	do	100.00	71 0	24 0	6 0	1906	do
No. 19	Clam-shell derrick boat	100.00	76 0	25 0	6 0	1906	do
No. 20	Barge	90.00	90 0	24 0	5 0	1907	Tuscaloosa, Ala.
No. 21	do	90.00	90 0	24 0	5 0	1907	do
No. 22	do	90.00	90 0	24 0	5 0	1907	do
No. 23	do	90.00	90 0	24 0	5 0	1908	do
A and B	Barges	17.60	54 0	18 0	3 0	1902	Mobile, Ala.
C and D	do	17.60	54 0	18 0	3 0	1909	Scranton, Miss.
E	Barge	167.46	91 0	27 2	8 0	1909	do
F	do	29.70	45 0	15 0	4 0	1901	do
New Orleans No. 15	do	168.00	91 0	27 0	7 8		

NOTE.—Where the "estimated value" appears larger than first cost in items hereon, machinery has been added and the increase thus caused, or repairs and improvements have been made. In the case of New Orleans No. 15, barge, all the data this office has is given.

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employed in the Engineer Department at Large on June 30, 1910—Continued.

MOBILE, ALA.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
When.	Where.						
1907	Mobile, Ala.....	Wood.	$900.00	$700.00	Fair...	Gulfport Harbor, Miss.	Fortification works Mobile.
1907	Morris Heights, N. Y.	...do...	2,350.00	1,800.00	...do...	Fort Morgan, Ala..	Mobile Harbor, Pascagoula River, and Horn Island Pass, Miss.
1910	Scranton, Miss..	...do...	600.00	600.00	Good .	Pascagoula River, Miss.	Pascagoula River, Miss.
.....	.....	...do...	3,215.00	3,000.00	...do...	.....do.....	Harbors on the coast of Mississippi.
.....	.....	...do...	2,000.00	1,200.00	...do...	Black Warrior River.	Black Warrior and Tombigbee rivers.
.....	.....	...do...	2,200.00	1,200.00	...do...	.....do.....	Do.
.....	.....	...do...	1,700.00	400.00	Bad...	.....do.....	Do.
.....	.....	...do...	46,600.00	42,000.00	Good .	.....do.....	Do.
.....	.....	...do...	1,900.00	800.00	Fair...	.....do.....	Do.
.....	.....	...do...	2,500.00	1,000.00	...do...	.....do.....	Do.
.....	.....	...do...	1,900.00	1,200.00	...do...	.....do.....	Do.
.....	.....	...do...	1,900.00	800.00	...do...	.....do.....	Do.
.....	.....	...do...	1,900.00	1,200.00	...do...	.....do.....	Do.
.....	.....	Wood and steel.	3,600.00	4,400.00	Good .	.....do.....	Do.
1905	Mobile, Ala.....	Wood.	1,650.00	600.00	Fair...	.....do.....	Do.
1905	.....do.....	...do...	1,500.00	200.00	Bad...	.....do.....	Do.
1905	.....do.....	...do...	1,800.00	400.00	...do ..	.....do.....	Do.
1905	.....do.....	...do...	1,500.00	400.00	...do...	.....do.....	Do.
1905	.....do.....	...do...	1,495.00	1,000.00	Fair...	.....do.....	Do.
.....	.....	...do...	2,300.00	1,800.00	Good..	.....do.....	Do.
.....	.....	...do...	2,300.00	1,600.00	...do...	.....do.....	Do.
.....	.....	...do...	2,300.00	1,700.00	...do...	.....do.....	Do.
.....	.....	...do...	2,300.00	1,400.00	...do...	Tombigbee River.	Do.
1905	Mobile, Ala.....	...do...	2,400.00	1,400.00	...do...	.....do.....	Do.
1905	Moss Point, Miss.	...do...	1,630.00	1,500.00	...do...	.....do.....	Do.
1906	.....do.....	...do...	2,000.00	1,500.00	...do...	.....do.....	Do.
1907	Mobile, Ala.....	...do...	2,050.00	4,500.00	...do...	.....do.....	Do.
.....	.....	...do...	2,200.00	1,800.00	...do...	Black Warrior River.	Do.
.....	.....	...do...	2,000.00	1,800.00	...do...	.....do.....	Do.
.....	.....	...do...	2,200.00	1,800.00	...do...	.....do.....	Do.
.....	.....	...do...	2,200.00	1,800.00	...do...	.....do.....	Do.
.....	.....	...do...	[a] 590.00	[a] 300.00	Fair...	Mobile Harbor and Pascagoula River.	Do.
.....	.....	...do...	[a] 600.00	[a] 550.00	Good .	Tombigbee and Pearl rivers.	Tombigbee and Pearl rivers.
.....	.....	...do...	3,642.00	3,400.00	...do...	Pascagoula River, Miss.	Harbor on coast of Mississippi.
1909	Scranton, Miss..	...do...	350.00	300.00	Fair...	.....do.....	Do.
.....	.....	...do...	.....	1,800.00	...do...	Gulfport Harbor, Miss.	New Orleans, La., district.

[a] Each.

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TABLE V.—*Statement of floating plant owned by the United States and*

MONTGOMERY, ALA.

Name or number.	Class and description.	Tonnage.	Dimensions.			Built.	
			Length.	Width.	Depth.	When.	Where.
			Ft. in.	Ft. in.	Ft. in.		
Canous	Sagging suction dredge	1,400.00	200 0	41 0	20 0	1905	Greenport, L. I.
Wm. J. Twining	Stern-wheel steam snag boat.	210.00	155 0	39 0	4 0	1881	Mobile, Ala.
Chattahoochee	do	188.00	140 0	29 0	4 0	1896	Bendock's Landing, Ala.[a]
Flint	do	102.00	95 0	24 0	4 0	1893–4	do
Choctawhatchee	do	60.00	90 0	24 0	3 6	1902–3	Pine Barren, Fla.
Escambia	do	60.00	90 0	24 0	3 6	1885	Montgomery, Ala.
Thronateeska	Snag boat with steam capstan.	65.00	75 0	26 0	4 7	1903	Bainbridge, Ga.
Alabama	Stern-wheel steam tow boat.	172.00	134 5	26 4	4 0	1895	Marietta, Ohio
Leota	do	58.00	120 0	20 0	4 10	1888	Gadsden, Ala.
Columbus	do	170.00	134 0	26 0	4 0	1904	Bainbridge, Ga.
Pettus	Stern-wheel hydraulic dredge.	247.00	135 0	35 0	6 6	1908	Gulfport, Miss., and Montgomery, Ala.
No. 1	Dipper dredge	110.00	75 0	26 4	5 6	1901	Columbus, Ga.
No. 2	do	110.00	75 0	26 4	5 6	1901	Mobile, Ala.
No. 3	do	110.00	75 0	26 4	5 6	1902	Lock 4, Coosa River, Ala.
No. 4	Barge equipped with dredging outfit.	125.00	100 0	28 0	6 6	1904	Bainbridge, Ga.
No. 5	Orange peel dredge	100.00	70 0	30 0	4 9	1908	Columbus, Ga.
Santa Rosa	Auxiliary schooner	40.00	70 0	18 8	9 6	1908	Pensacola Navy-yard, Fla.
Arrow	Gasoline launch		31 0	7 0	4 0	1910	Building at Fort Pickens, Fla.
Eufaula	do		25 0	7 3	2 4	1905	St. Joseph, Mich.
Catoma	Kerosene launch		25 0	7 3	2 4	1907	do
Barge	Hull of old steamboat		120 0	18 0	4 0	1891	Rome, Ga.
No. 1	Pile-driver barge		81 0	22 0	4 0	1891	Cahaba, Ala.

[a] Near Fort Mitchell, Ala.

[b] Rebuilt, 1909, at Pine Barren, Fla.

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employed in the Engineer Department at Large on June 30, 1910—Continued.

MONTGOMERY, ALA.

Purchased. When.	Purchased. Where.	Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
1905	New York, N. Y.	Wood.	$150,000.00	$170,000.00	Good..	Pensacola Harbor, Fla.	Improving harbor, Pensacola, Fla.
.....	.....	...do...	22,000.00	18,500.00	...do...	Between Selma and Jewett's Bar, Alabama River.	Improving Alabama River, Ala
.....	.....	...do...	12,000.00	14,441.00	...do...	Tied up, Apalachicola, Fla.	Improving Chattahoochee River, Ga. and Ala.
.....	.....	...do...	4,500.00	7,000.00	...do...	Between cut-off, Apalachicola River and Columbus, Ga.	Improving Flint River, Ga.
.....	.....	...do...	5,400.00	4,000.00	Fair...	Tied up, Freeport, Fla.	Improving Choctawhatchee River, Fla. and Ala.
.....	.....	...do...	3,500.00	5,500.00	Good..	Near Brewton, Ala.	Improving Escambia and Conecuh rivers, Fla. and Ala.
1903	Bainbridge, Ga.	...do...	7,460.00	3,500.00	Fair...	Tied up, Columbus, Ga.	Improving Flint River, Ga.
1895	Louisville, Ky.	...do...	15,000.00	9,500.00	Good..	Tied up, Selma, Ala. (repairing machinery).	Improving Alabama River, Ala.
1892	Gadsden, Ala.	...do...	6,000.00	14,000.00	...do...	Tied up, Lock 3, Ala.	Improving Coosa River, Ga. and Ala., between Rome, Ga. and Lock 4, Ala.
1894	Bainbridge, Ga.	...do...	20,760.00	19,500.00	...do...	Tied up, Columbus, Ga. (repairing shaft).	Improving Chattahoochee River, Ga. and Ala.
.....	.....	Creosoted wood.	60,351.00	56,000.00	...do...	Between Gardners and Hobbs islands, Alabama River.	Improving Alabama River, Ala.
.....	.....	Wood.	13,749.00	12,000.00	...do...	Between cut-off, Apalachicola River and Columbus, Ga.	Improving Chattahoochee River, Ga. and Ala.
.....	.....	...do...	13,440.00	7,650.00	Fair...	Gardner's Island..	Improving Alabama River, Ala.
.....	.....	...do...	10,000.00	10,000.00	Good..	Tied up, Lock 3, Ala.	Operating and care canals, etc., Coosa River, Ga. and Ala.
1904	Bainbridge, Ga.	...do...	12,900.00	12,000.00	...do...	Tied up, Columbus, Ga. (repairing machinery).	Improving Chattahoochee River, Ga. and Ala.
.....	.....	...do...	11,730.84	11,000.00	...do...	Sanborn's Rock, Flint River, Ga.	Improving Flint River, Ga.
1908	Pensacola Navy-yard, Fla.	...do...	21,423.96	21,400.00	...do...	Pensacola Harbor, Fla.	Improving harbor, Pensacola, Fla.
.....	.....	...do...	.....	.....	.....	Building at Ft. Pickens, Fla., 95 per cent completed June 30, 1910.	Do.
1905	St. Joseph, Mich.	...do...	950.00	700.00	Good..	Columbus, Ga.....	Improving Chattahoochee River, Ga. and Ala.
1907	.....do.....	...do...	1,225.00	800.00	...do...	Jewett's Bar, Alabama River.	Improving Alabama River, Ala.
1901	Gadsden, Ala.	...do...	350.00	.....	Worthless.	Sunk at Lock 3, Ala., to be condemned.	Operating and care canals, etc., Coosa River, Ga. and Ala.
.....	.....	...do...	2,500.00	.....	...do...	Sunk near Montgomery, Ala., to be condemned.	Improving Alabama River, Ala.

[a] Rebuilt, 1908, at Lock 4, Ala., at cost of $14,000.

[b] Rebuilt, 1909–10, at Columbus, Ga.

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TABLE V.—*Statement of floating plant owned by the United States and*

MONTGOMERY, ALA.—Continued.

Name or number.	Class and description.	Tonnage.	Dimensions.			Built.	
			Length.	Width.	Depth.	When.	Where.
			Ft. in.	Ft. in.	Ft. in.		
No. 2	Pile-driver barge		40 0	18 0	3 0	1906	Mobile, Ala.
No. 3	....do		30 0	16 0	2 0	1906	Wetumpka, Ala.
Nos. 4 and 5	Pile-driver barges		40 0	18 0	3 0	[a]1904	Burdock's Landing, Ala.[b]
Barges Nos. 6, 7, 8, and 9.	Flatboats		80 0	22 0	4 2	1905	Mobile, Ala.
Barges Nos. 10, 11, 12, 13.	Flatboats (creosoted)		80 0	22 0	4 2	1907	....do
Barges Nos. 14 and 15	....do		80 0	22 0	4 2	1907	Gulfport, Miss., and Lock 3, Ala.[c]
No. 16	Drilling barge		65 0	24 0	3 9	[a]1903	Bainbridge, Ga.
No. 17	Pile-driver barge		40 0	18 0	3 0	[d]1904	Burdock's Landing, Ala.
No. 18	Rock barge		30 0	10 0	1 8	1903	....do
Nos. 19 and 20	....do		125 0	28 0	5 2	1903	Bainbridge, Ga.
Barge No. 21	Flat boat		40 0	18 0	3 0	1907	Columbus, Ga.
Barge No. 22	....do		60 0	20 0	3 0	1907	River Falls, Ala.
Barge No. 23	....do		80 0	29 0	5 0	1894	Pensacola, Fla.
Barge No. 24	....do		72 0	27 0	5 0	1895	....do
Barge No. 25	Fitted temporarily with dredging outfit.		80 0	29 0	5 0	1894	....do
No. 26	Pile-driver barge		40 0	18 0	3 0	1910	Columbus, Ga.
Barges Nos. 27 and 28	Flat boats (creosoted)		124 0	28 0	6 6	1910	New Orleans, La.
Dump scows Nos. 1 and 2	....do		73 0	20 0	6 1	1903	Bainbridge, Ga.
Quarter boats Nos. 1 and 2	House boats		50 0	20 0	2 3	1906	Mobile, Ala.
Quarter boat No. 3	....do		60 0	16 0	2 0	1907	River Falls, Ala.
Quarter boat No. 4	....do		70 0	21 6	3 0	1907	Columbus, Ga.
Pontons Nos. 1 to 42 (inclusive).	Small flat boats		16 0	4 0	1 9	(*e*)	Montgomery, Ala., Wetumpka, Ala.

[a] Rebuilt, 1910, at Columbus, Ga.
[b] Near Fort Mitchell, Ala.
[c] Framed and creosoted at Gulfport, Miss., and built at Lock 3, Ala.
[d] Formerly rock barge; rebuilt and converted into pile-driver barge A10 at Columbus, Ga.

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employed in the Engineer Department at Large on June 30, 1910—Continued.

MONTGOMERY, ALA.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
When.	Where.						
1906	Mobile, Ala.....	Wood.	$742.00	$450.00	Poor..	Gardner's Island (quarters boat).	Improving Alabama River, Ala.
.....	.....	...do...	300.00	100.00	...do...	Jewett's Bar(quarters boat).	Do.
.....	.....	...do...	750.00	750.00	Good..	Tied up, Columbus, Ga.	Improving Chattahoochee River, Ga. and Ala.
1906	Mobile, Ala.....	...do...	6,812.00	2,000.00	Decks good, frames and sides poor.	Gardner's Island..	Improving Alabama River, Ala.
1907	.....do.....	Creosoted wood.	11,900.00	9,000.00	Good..	.....do.....	Do.
1907	Gulfport, Miss...	...do...	8,015.00	8,000.00	...do...	Tied up, Lock 3, Ala.	Operating and care canals, etc., Coosa River, Ga. and Ala.
.....	.....	Wood.	2,980.00	5,000.00	...do...	Sanborn's Rock, Flint River, Ga.	Improving Flint River, Ga.
.....	.....	...do...	300.00	375.00	...do...	Tied up, Columbus, Ga.	Do.
.....	.....	...do...	300.00	.....	Worthless.	Beached at "Tea-Cup" Shoals Flint River.	Do.
.....	.....	...do...	8,000.00	*3,500.00	Good..	At Burdock's Landing.	Improving Chattahoochee River, Ga. and Ala.
.....	.....	...do...	450.00	200.00	Fair...	.....do.....	Do.
.....	.....	...do...	1,250.00	1,000.00	...do...	Tied up, Pine Barren, Fla.	Improving Escambia and Conecuh rivers, Fla. and Ala.
1896	Pensacola, Fla..	...do...	1,350.00	.....	Worthless.	Tied up, Burdock's Landing, Chattahoochee River.	National defense (war), gun and mortar batteries.
1898	.....do.....	...do...	1,850.00	500.00	Poor..	Tied up, Columbus, Ga.	Do.
1896	.....do.....	...do...	1,850.00	†1,900.00	Fair...	Tied up, Freeport, Fla.	Gun and mortar batteries.
.....	.....	...do...	375.00	375.00	Good..	Tied up, Columbus, Ga.	Improving Chattahoochee River, Ga. and Ala.
1910	New Orleans, La.	Creosoted wood.	8,303.00	8,303.00	...do...	Tied up, Selma, Ala.	Improving Alabama River, Ala.
1903	Bainbridge, Ga..	Wood.	7,600.00	200.00	Worn-out.	Tied up in Yellow River, Fla.	Improving Chattahoochee River, Ga. and Ala.
1906	Mobile, Ala.....	...do...	3,180.00	900.00	Houses good, hulls poor.	Gardners Island...	Improving Alabama River, Ala.
.....	.....	...do...	1,000.00	900.00	Good..	Tied up, Pine Barren, Fla.	Improving Escambia and Conecuh rivers, Fla. and Ala.
.....	.....	...do...	2,500.00	2,200.00	...do...	Tied up, Burdock's Landing.	Improving Chattahoochee River, Ga. and Ala.
.....	.....	...do...	2,310.00	2,100.00	...do...	Gardners Island...	Improving Alabama River, Ala.

* No. 19, No. 20 sunk at Jernigan's Landing.
† New boiler installed.
‡ Four were built in 1908 and 38 in 1910.

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TABLE V.—*Statement of floating plant owned by the United States and*

NASHVILLE, TENN.

Name or number.	Class and description.	Tonnage.	Dimensions.			Built.	
			Length.	Width.	Depth.	When.	Where.
			Ft. in.	Ft. in.	Ft. in.		
Cumberland	Towboat, stern wheel	98.00	130 0	24 0	4 0	1898	Jeffersonville, Ind.
John	Tender	40.00	86 0	18 0	2 6	1903	.....do.....
Henry	.....do.....	40.00	86 0	18 0	2 6	1903	.....do.....
Tom Ray	Towboat, stern wheel	9.00	60 0	18 0	1 6	1908	Nashville, Tenn.
Little Ben	Gasoline tow, stern wheel	5.00	45 0	11 0	1 6	1901	Louisville, Ky.
Dredge	10-inch suction	.....	90 0	24 0	3 6	1909 1910	Muscle Shoals Canal.
Do	Dipper	.....	80 0	30 0	7 0	1903	Jeffersonville, Ind.
Apex	Snag-boat hull	66.00	80 0	24 0	3 0	1896	Lock 4, Cumberland River.
No. 1	Snag boat	72.00	90 0	24 0	2 6	1909 1910	Lock 7, Cumberland River.
No. 1	Gasoline tender	22.00	75 0	15 0	2 6	1910	.....do.....
Nos. 1 and 2	Side-dump scows	75.00	73 0	20 0	6 0	1903	Jeffersonville, Ind.
Nos. 3 and 4	.....do.....	75.00	80 0	20 0	5 0	1909	Muscle Shoals Canal.
2 boats	Derrick	150.00	70 0	26 0	4 0	1903	Madison, Ind.
Boat	.....do.....	30.00	55 0	18 0	3 0	1898	Obion, Tenn.
No. 3	Derrick boat	100.00	80 0	30 0	4 2	1909	Lock 3, Cumberland River.
6 barges	Decked	130.00	90 0	18 0	4 0	1903	Madison, Ind.
No. 7	Decked barge	240.00	110 0	22 0	5 0	1909	Lock 3, Cumberland River.
No. 8	.....do.....	240.00	110 0	22 0	5 0	1908	.....do.....
Barge	.....do.....	34.00	40 0	14 0	2 0	1908	Dover, Tenn.
Nos. 10 and 12	Barges	99.00	100 0	22 0	5 0	1909	Muscle Shoals Canal.
No. 11	Barge	99.00	100 0	22 0	5 0	1909	.....do.....
Boat	Quarter	42.00	65 0	14 0	2 6	1907	Lock 2, Cumberland River.
Do	Catamaran	10.00	24 0	5 0	1 8	1907	.....do.....
2 boats	Life, metal	.50	12 0	4 0	1 6	1908	Grafton, Ill.
Boat	.....do.....	2.00	14 0	4 6	2 0	1906	.....do.....
Boats	Row	.50	18 0	3 0	1 0	1909	Lock 4, Cumberland River.
2 batteaux	Paddle	.50	18 0	3 0	1 6	1910	Locks 4 and 5, Cumberland River.
Skiff	Double-oar	1.00	18 0	3 0	1 6	1903	Leavenworth, Ind.
6 skiffs	.....do.....	1.00	18 0	2 6	1 4	1907	.....do.....
Skiff	.....do.....	1.00	18 0	2 6	1 4	1908	.....do.....
3 skiffs	.....do.....	1.00	18 0	2 2	1 4	1908	.....do.....
2 boats	Ferry	6.00	45 0	6 0	1 10	1909	Lock 3, Cumberland River.

NEW LONDON, CONN.

Castle	Steam tug	85.00	95 0	19 0	10 6	1897	Baltimore, Md.
Panuco	Steam lighter	192.00	106 4½	28 0	8 0	1882	Boston, Mass.
Katharine	Motor boat	.....	30 6	7 6	.....	1909	South Norwalk, Conn.

a No money value.

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employed by the Engineer Department at Large on June 30, 1910—Continued.

NASHVILLE, TENN.

Purchased. When.	Purchased. Where.	Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
1898	Jeffersonville, Ind.	Wood.	$12,400.00	$8,200.00	Good..	Cumberland River.	Cumberland River.
1903	.....do.....	...do...	4,535.00	2,000.00	Fair...	.....do.....	Do.
1903	.....do.....	...do...	4,535.00	2,000.00	...do...	.....do.....	Do.
1909	Nashville, Tenn.	...do...	1,000.00	800.00	...do...	.....do.....	Do.
1909	.....do.....	...do...	800.00	500.00	...do...	.....do.....	Do.
.....	.....	...do...	10,566.53	10,500.00	Good..	.....do.....	Do.
1903	Jeffersonville, Ind.	...do...	18,650.00	10,000.00	Fair...	.....do.....	Do.
.....	.....	...do...	1,100.00	(a)	Worn-out.	.....do.....	Do.
.....	.....	...do...	3,018.27	3,018.27	Good..	.....do.....	Do.
.....	.....	...do...	3,918.51	3,918.51	...do...	.....do.....	Do.
1908	Jeffersonville, Ind.	...do...	7,360.00	(a)	Poor..	.....do.....	Do.
.....	.....	...do...	5,628.38	5,000.00	Good..	.....do.....	Do.
1903	Jeffersonville, Ind.	...do...	2,880.00	(a)	Poor..	.....do.....	Do.
.....	.....	...do...	1,500.00	...do.....	...do...	Obion and Forked Deer rivers.	Obion and Forked Deer rivers.
.....	.....	...do...	4,367.82	4,500.00	Good..	Cumberland River.	Cumberland River.
1903	Jeffersonville, Ind.	...do...	9,018.00	(a)	Poor..	.....do.....	Do.
.....	.....	...do...	2,332.16	2,000.00	Good..	.....do.....	Do.
.....	.....	...do...	2,592.29	2,000.00	...do...	.....do.....	Do.
.....	.....	...do...	84.26	(a)	Poor..	.....do.....	Do.
.....	.....	...do...	5,128.60	4,000.00	Good..	.....do.....	Do.
.....	.....	...do...	2,819.30	2,400.00	...do...	.....do.....	Do.
.....	.....	...do...	1,198.71	800.00	Fair...	.....do.....	Caney Fork River.
.....	.....	...do...	175.53	(a)	Poor..	.....do.....	Cumberland River.
1906	Grafton, Ill.....	Galvanized iron.	91.00	75.00	Good..	.....do.....	Do.
1906	.....do.....	...do...	49.50	40.00	...do...	.....do.....	Do.
.....	.....	Wood.	12.00	(a)	Poor..	.....do.....	Do.
.....	.....	...do...	12.00	12.00	Good..	.....do.....	Do.
1904	Leavenworth, Ind.	...do...	20.00	(a)	Worn out.	.....do.....	Do.
1907	.....do.....	...do...	210.00	80.00	Poor..	.....do.....	Do.
1908	.....do.....	...do...	30.00	15.00	Fair...	.....do.....	Do.
1908	.....do.....	...do...	105.00	75.00	...do...	.....do.....	Do.
.....	.....	...do...	337.01	240.00	...do...	.....do.....	Do.

NEW LONDON, CONN.

1897	Baltimore, Md..	Steel..	$24,973.22	$13,500.00	Good..	New London, Conn.	River and harbor works.
1899	New London, Conn.	Wood.	10,000.00	4,000.00	Fair...	.....do.....	Gun and mortar batteries.
1909	Darien, Conn...	...do...	775.00	775.00	Good..	Surveying river and harbor works.	River and harbor works.

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TABLE V.—*Statement of floating plant owned by the United States and*

NEW ORLEANS, LA.

Name or number.	Class and description.	Tonnage.	Dimensions.			Built.	
			Length.	Width.	Depth.	When.	Where.
			Ft. in.	Ft. in.	Ft. in.		
Benyaurd	Hydraulic dredge	2,006.20	271 6	47 6	23 0	1900 1904	Richmond, Va. Norfolk, Va.
St. Johns[a]	do	1,047.00	205 0	41 0	20 0	1905	Greenport, N. Y.
Sumter[b]	do		198 5	41 0	21 0	1904	Petersburg, Va.
Delatour	Hydraulic dredge and snagboat.	157.00	112 0	30 0	5 0	1909	Jeffersonville, Ind.
Tonty[c]	Steam yacht	54.53	96 1	16 0	5 6	1886[d]	New York, N. Y.
General Reese	Steam launch	11.00	48 0	12 0	5 0	1876	New Orleans, La.
Uncha[f]	Steam tug	33.00	61 0	14 0	7 6	1878	Philadelphia, Pa.
Hyacinth	Steamboat		89 0	18 0	2 6	1906	New Orleans, La.
Ramos[g]	do	71.00	100 0	22 6	3 1	1896	Ramos, La.
Picket	Survey boat	30.00	52 0	12 3	6 3	1905	Madisonville, La.
Stadia	Naphtha launch		30 0	6 6	2 0	1894	New York, N. Y.
No. 1	Steam pile driver	50.00	54 6	24 6	3 8½	1896	Port Eads, La.
No. 2	Combined pile driver and derrick.	94.00	75 6	30 0	5 0	1910	Lake Charles, La.
No. 1	Steam derrick	69.00	61 0	24 0	4 6	1887	Port Eads, La.
No. 1	Barge	84.00	90 0	20 0	4 6	1885	Pittsburg, Pa.
No. 6	do	116.00	100 0	22 3	5 0	1905	New Orleans, La.
No. 9	do	116.00	100 0	22 3	5 0	1905	Madisonville, La.
No. 10	do	116.00	100 0	22 3	5 0	1905	do.
No. 11	do	116.00	100 0	22 3	5 0	1906	do.
No. 12	do	116.00	100 0	22 3	5 0	1906	do.
No. 13	do	112.00	80 3	25 3	7 0	1904	Pearlington, Miss.
No. 15	do	112.00	89 11	27 3	7 6		(*f*)
No. 16	do	100.00	100 0	22 3	5 6	1910	New Orleans, La.
No. 17	do	100.00	100 0	22 3	5 6	1910	do.
No. 18	do	100.00	100 0	22 3	5 6	1910	do.
No. 19	do	100.00	100 0	22 3	5 6	1910	do.

NEW ORLEANS, LA. (FOURTH MISSISSIPPI RIVER COMMISSION DISTRICT).

Alpha	Quarterboat		79 6	20 6	3 6	1884	St. Louis, Mo.
Beta	do		79 6	20 6	3 6	1884	do.
Gamma	do		130 0	31 6	3 4	1888	Simmsport, La.
Delta	do		130 0	31 6	3 4	1888	do.
New Orleans	Quarterboat (creosoted)		166 0	34 8	4 3	1889	New Orleans, La.
Natchez	do		140 0	30 0		1908	do.
Baton Rouge	do		140 0	30 0	1 8	1910	do.

[a] Borrowed from Jacksonville (Fla.) district.
[b] Formerly General Abbott, borrowed from Charleston (S. C.) district.
[c] Formerly No. 150372, Chere Amie.
[d] Rebuilt in 1905 at New Orleans, La.

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employed in the Engineer Department at Large on June 30, 1910—Continued.

NEW ORLEANS, LA.

Purchased. When.	Purchased. Where.	Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
1905	New Orleans, La.	Steel..	$414,238.37	$196,830.00	Good..	Passes of Mississippi River.	South Pass and Southwest Pass, Mississippi River.
.....	.....	Wood.	.....	153,900.00	...do...	.....do.....	Do.
.....	.....	...do...	.....	121,500.00	...do...	.....do.....	Do.
1909	New Orleans, La.	...do...	39,812.45	39,812.45	...do...	New Orleans district.	Bogue Falia, Bayous Manchac and Vermilion, Calcasieu, Tickfaw, Amite, and Chefuncte rivers, La.
1897	New York, N. Y.	(a)	8,900.00	14,580.00	...do...	Passes of Mississippi River.	South Pass and Southwest Pass, Mississippi River.
1876	New Orleans, La.	Wood.	3,500.00	1,013.00	Fair...	.....do.....	Do.
1901	Port Eads, La...	Iron...	10,000.00	5,670.00	Good..	.....do.....	Do.
1905	Patterson, La...	Wood.	8,000.00	7,380.00	...do...	New Orleans district.	Removing the water hyacinth, Texas and Louisiana.
1899	New Orleans, La.	...do...	8,500.00	1,350.00	Bad...	.....do.....	Do.
1905	.....do.....	...do...	7,189.00	5,103.00	Good..	Southwest Pass, Mississippi River.	Southwest Pass, Mississippi River.
1894	New York, N. Y.	...do...	.....	1,800.00	Fair...	Plaquemine, La...	Bayou Plaquemine, La.
1901	Port Eads, La...	...do...	3,000.00	3,344.00	Good..	South Pass, Mississippi River.	South Pass, Mississippi River.
1910	New Orleans, La.	...do...	9,192.06	9,192.06	...do...	Southwest Pass, Mississippi River.	Southwest Pass Mississippi River.
[f]1901	Port Eads, La...	...do...	2,000.00	2,034.00	...do...	South Pass, Mississippi River.	South Pass, Mississippi River.
1901	.....do.....	Steel and wood.	1,200.00	135.00	Bad...	.....do.....	Do.
1905	New Orleans, La.	Wood.	2,250.00	1,134.00	Good..	.....do.....	Do.
1905	New Orleans, La.	Wood.	2,800.00	1,800.00	Good..	.....do.....	Do.
1905	.....do.....	...do...	2,800.00	1,800.00	...do...	.....do.....	Do.
1906	.....do.....	...do...	2,800.00	2,000.00	...do...	.....do.....	Do.
1906	.....do.....	...do...	2,800.00	2,000.00	...do...	.....do.....	South Pass Channel, Mississippi River.
1906	.....do.....	...do...	4,500.00	3,000.00	...do...	Southwest Pass, Mississippi River.	Southwest Pass, Mississippi River.
1906	.....do.....	...do...	5,000.00	3,150.00	...do...	.....do.....	Do.
1910	.....do.....	...do...	2,410.50	2,410.50	...do...	.....do.....	Do.
1910	.....do.....	...do...	2,410.50	2,410.50	...do...	.....do.....	Do.
1910	.....do.....	...do...	2,410.50	2,410.50	...do...	.....do.....	Do.
1910	.....do.....	...do...	2,410.50	2,410.50	...do...	.....do.....	Do.

NEW ORLEANS, LA. (FOURTH MISSISSIPPI RIVER COMMISSION DISTRICT).

.....	.....	Wood.	$2,500.00	$1,000.00	Fair...	Surveys.....	Improving Mississippi River, fourth district.
.....	.....	...do...	2,500.00	300.00	Bad...	.....do.....	Do.
.....	.....	...do...	4,500.00	1,500.00	...do...	Bank protection...	Do.
.....	.....	...do...	4,500.00	1,500.00	...do...	.....do.....	Do.
.....	.....	...do...	10,000.00	9,100.00	Good..	.....do.....	Do.
.....	.....	...do...	9,000.00	9,100.00	...do...	.....do.....	Do.
.....	.....	...do...	10,000.00	10,000.00	...do...	.....do.....	Do.

[a] Original hull wood, new hull steel.
[f] Formerly No. 115599, Startle.
[g] Formerly No. 111126, Ramos.
[h] Rebuilt in 1910 at New Orleans, La.
[i] Rebuilt in 1903.
[j] Unknown.

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TABLE V.—*Statement of floating plant owned by the United States and*

NEW ORLEANS, LA. (FOURTH MISSISSIPPI RIVER COMMISSION DISTRICT)—Cont'd.

Name or number.	Class and description.	Tonnage.	Dimensions.			Built.	
			Length.	Width.	Depth.	When.	Where.
			Ft. in.	Ft. in.	Ft. in.		
St. Joseph	Quarterboat (creosoted)		140 0	30 0	1 8	1910	New Orleans, La.
Lake Borgne	Quarterboat		65 0	16 0	4 0		
The Ram	Self-propelling hydraulic dredge.	225.00	125 0	30 0	7 6	1893	Jeffersonville, Ind.
Grader No. 1	Hydraulic grader		124 0	30 0	7 7	1900	New Orleans, La.
Floating derrick	Steam power	200.00	100 0	30 0	3 6	1908	do.
Genl. John Newton	Stern-wheel steamboat	221.00	149 0	24 0	7 6	1899	Dubuque, Iowa.
Tenas	do.	78.00	93 6	20 4	2 0	1905	Chicago, Ill.
Morganza	Tugboat	79.00	84 0	19 0	8 8	1892	Philadelphia, Pa.
Tunica	do.	77.00	85 0	19 0	9 8	1898	Baltimore, Md.
Marengo	do.	74.00	78 4	18 2	6 8	1893	do.
Manchac	do.	57.00	76 0	16 0	7 0	1886	Paducah, Ky.
Beatrice	Gasoline launch		30 0	6 6	3 2	1906	St. Louis, Mo.
Dry dock	Ordinary type		104 0	30 0	9 6	1896	New Orleans, La.
Barataria	Levee-building machine	300.00	102 0	36 0	6 0	1908	do.
No. 1	Decked barge (creosoted)	500.00	124 0	30 0	7 7	1908	do.
No. 2	do.	500.00	124 0	30 0	7 7	1908	do.
No. 3	do.	500.00	124 0	30 0	7 7	1908	do.
No. 4	do.	500.00	124 0	30 0	7 7	1900	Madisonville, La.
No. 5	do.	500.00	124 0	30 0	7 7	1904	Pascagoula, Miss.
No. 6	do.	500.00	124 0	30 0	7 7	1904	do.
No. 7	do.	500.00	124 0	30 0	7 7	1904	do.
No. 8	do.	500.00	124 0	30 0	7 7	1903	New Orleans, La.
No. 9	do.	500.00	124 0	30 0	7 7	1904	Pascagoula, Miss.
No. 10	do.	500.00	124 0	30 0	7 7	1900	Elizabeth, Pa.
No. 11	do.	500.00	124 0	30 0	7 7	1900	do.
No. 12	do.	500.00	124 0	30 0	7 7	1903	Pascagoula, Miss.
No. 13	do.	500.00	124 0	30 0	7 7	1900	Elizabeth, Pa.
No. 14	do.	500.00	124 0	30 0	7 7	1900	do.
No. 15	Decked barge	500.00	124 0	30 0	7 7	1893	New Orleans, La.
No. 16	do.	500.00	124 0	30 0	7 7	1899	Slidell, La.
No. 17	do.	500.00	124 0	30 0	7 7	1893	New Orleans, La.
No. 18	do.	500.00	124 0	30 0	7 7	1893	do.
No. 19	Decked barge (creosoted)	500.00	124 0	30 0	7 7	1905	do.
No. 20	do.	500.00	124 0	30 0	7 7	1908	do.
No. 21	do.	500.00	124 0	30 0	7 7	1908	do.
No. 22	do.	500.00	124 0	30 0	7 7	1907	do.
No. 23	do.	500.00	124 0	30 0	7 7	1907	do.
No. 24	do.	500.00	124 0	30 0	7 7	1907	do.
No. 25	do.	500.00	124 0	30 0	7 7	1908	do.
No. 26	do.	500.00	124 0	30 0	7 7	1906	do.
No. 27	do.	500.00	124 0	30 0	7 7	1907	do.
No. 28	Decked barge	500.00	124 0	30 0	7 7	1899	Slidell, La.
No. 29	Decked barge (creosoted)	500.00	124 0	30 0	7 7	1900	Elizabeth, Pa.
No. 30	Decked barge	500.00	124 0	30 0	7 7	1900	Madisonville, La.
No. 31	do.	500.00	124 0	30 0	7 7	1900	do.
No. 32	do.	500.00	124 0	30 0	7 7	1900	do.
No. 33	Decked barge (creosoted)	500.00	124 0	30 0	7 7	1903	Pascagoula, Miss.
No. 34	do.	500.00	124 0	30 0	7 7	1903	do.
No. 35	do.	500.00	124 0	30 0	7 7	1903	do.
No. 36	do.	500.00	124 0	30 0	7 7	1904	do.
No. 37	do.	500.00	124 0	30 0	7 7	1904	do.
No. 38	do.	500.00	124 0	30 0	7 7	1904	do.
No. 39	do.	500.00	124 0	30 0	7 7	1904	do.
No. 40	do.	500.00	124 0	30 0	7 7	1904	do.
No. 41	do.	500.00	124 0	30 0	7 7	1904	do.
No. 42	do.	500.00	124 0	30 0	7 7	1904	do.
No. 43	do.	500.00	124 0	30 0	7 7	1906	New Orleans, La.
No. 44	do.	500.00	124 0	30 0	7 7	1907	do.
No. 45	do.	500.00	124 0	30 0	7 7	1907	do.
No. 46	do.	500.00	124 0	30 0	7 7	1908	do.
No. 47	do.	500.00	124 0	30 0	7 7	1908	do.
No. 48	do.	500.00	124 0	30 0	7 7	1909	do.
No. 49	do.	500.00	124 0	30 0	7 7	1909	do.
No. 50	do.	500.00	124 0	30 0	7 7	1909	do.
No. 51	do.	500.00	124 0	30 0	7 7	1909	do.
No. 52	do.	500.00	124 0	30 0	7 7	1909	do.
No. 53	do.	500.00	124 0	30 0	7 7	1909	do.

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employed in the Engineer Department at Large on June 30, 1910—Continued.

NEW ORLEANS, LA. (FOURTH MISSISSIPPI RIVER COMMISSION DISTRICT)—Cont'd.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
When.	Where.						
.....	.....	Wood.	$10,000.00	$10,000.00	Good..	Bank protection ..	Improving Mississippi River, fourth district.
1907	Natchez, Miss...	...do...	650.00	500.00	Bad...	Building levees....	Do.
.....	.....	Steel..	69,500.00	43,000.00	Good..	Dredging channel.	Improving Red and Atchafalaya rivers, La.
.....	.....	Wood.	20,000.00	17,000.00	...do...	Bank protection...	Improving Mississippi River, fourth district.
.....	.....	...do...	6,000.00	5,300.00	...do...	New Orleans, La..	Do.
.....	.....	Steel..	29,138.00	25,400.00	...do...	Bank protection...	Do.
.....	.....	...do...	11,120.00	9,500.00	...do...	.....do.....	Do.
1902	New York City..	...do...	30,000.00	25,400.00	...do...	.....do.....	Do.
1899	Baltimore, Md..	...do...	22,000.00	18,500.00	...do...	.....do.....	Do.
1902	.....do.....	...do..	15,000.00	12,750.00	...do ..	.....do.....	Do.
1887	Paducah, Ky...	Wood.	6,555.00	3,800.00	Bad...	.....do.....	Do.
.....	.....	...do...	1,750.00	1,250.00	Fair...	Surveys.....	Do.
.....	.....	...do...	2,787.00	500.00	Poor..	New Orleans, La..	Do.
.....	.....	...do...	22,000.00	21,100.00	Good..	Building levees....	Do.
.....	.....	...do...	4,250.00	4,600.00	...do...	Bank protection..	Do.
.....	.....	...do...	4,250.00	4,600.00	...do...	.....do.....	Do.
.....	.....	...do...	4,250.00	4,600.00	...do...	.....do.....	Do.
.....	.....	...do...	3,750.00	400.00	Fair...	.....do.....	Do.
.....	.....	...do...	4,400.00	3,800.00	Good..	.....do.....	Do.
.....	.....	...do...	4,400.00	3,800.00	...do...	.....do.....	Do.
.....	.....	...do...	4,400.00	3,800.00	...do...	.....do.....	Do.
.....	.....	...do...	4,000.00	3,800.00	...do...	.....do.....	Do.
.....	.....	...do...	4,400.00	3,800.00	...do...	.....do.....	Do.
.....	.....	...do...	3,800.00	3,000.00	...do...	.....do.....	Do.
.....	.....	...do...	3,800.00	3,000.00	...do...	.....do.....	Do.
.....	.....	Wood.	4,000.00	3,800.00	Good..	.....do.....	Do.
.....	.....	...do...	3,800.00	3,000.00	...do...	.....do.....	Do.
.....	.....	...do...	3,800.00	3,000.00	...do...	.....do.....	Do.
.....	.....	...do...	3,650.00	25.00	Bad...	.....do.....	Do.
.....	.....	...do...	3,674.00	200.00	...do...	.....do.....	Do.
.....	.....	...do...	3,650.00	200.00	...do...	.....do.....	Do.
.....	.....	...do...	3,650.00	200.00	...do...	.....do.....	Do.
.....	.....	...do...	4,675.00	4,000.00	Good..	.....do.....	Do.
.....	.....	...do...	4,250.00	4,600.00	...do...	.....do.....	Do.
.....	.....	...do...	4,250.00	4,600.00	...do...	.....do.....	Do.
.....	.....	...do...	4,725.00	4,400.00	...do...	.....do.....	Do.
.....	.....	...do...	4,725.00	4,400.00	...do...	.....do.....	Do.
.....	.....	...do...	4,725.00	4,400.00	...do...	.....do.....	Do.
.....	.....	...do...	4,250.00	4,600.00	...do...	.....do.....	Do.
.....	.....	...do...	4,675.00	4,200.00	...do...	.....do.....	Do.
.....	.....	...do...	4,725.00	4,400.00	...do...	.....do.....	Do.
.....	.....	...do...	3,674.00	200.00	Bad...	.....do.....	Do.
.....	.....	...do...	3,800.00	3,000.00	Good..	.....do.....	Do.
.....	.....	...do...	3,750.00	200.00	Bad...	.....do.....	Do.
.....	.....	...do...	3,750.00	200.00	...do...	.....do.....	Do.
.....	.....	...do...	3,750.00	200.00	...do...	.....do.....	Do.
.....	.....	...do...	4,000.00	3,600.00	Good..	.....do.....	Do.
.....	.....	...do...	4,000.00	3,600.00	...do...	.....do.....	Do.
.....	.....	...do...	4,000.00	3,600.00	...do...	.....do.....	Do.
.....	.....	...do...	4,400.00	3,800.00	...do...	.....do.....	Do.
.....	.....	...do...	4,000.00	3,800.00	...do...	.....do.....	Do.
.....	.....	...do...	4,400.00	3,800.00	...do...	.....do.....	Do.
.....	.....	...do...	4,000.00	3,800.00	...do...	.....do.....	Do.
.....	.....	...do...	4,000.00	3,800.00	...do...	.....do.....	Do.
.....	.....	...do...	4,000.00	3,800.00	...do...	.....do.....	Do.
.....	.....	...do...	4,400.00	3,800.00	...do...	.....do.....	Do.
.....	.....	...do...	4,675.00	4,200.00	...do...	.....do.....	Do.
.....	.....	...do...	4,725.00	4,600.00	...do...	.....do.....	Do.
.....	.....	...do...	4,725.00	4,600.00	...do...	.....do.....	Do.
.....	.....	...do...	4,250.00	4,600.00	...do...	.....do.....	Do.
.....	.....	...do...	4,250.00	4,600.00	...do...	.....do.....	Do.
.....	.....	...do...	4,250.00	4,600.00	...do...	.....do.....	Do.
.....	.....	...do...	5,000.00	5,000.00	...do...	.....do.....	Do.
.....	.....	...do...	5,000.00	5,000.00	...do...	.....do.....	Do.
.....	.....	...do...	5,000.00	5,000.00	...do...	.....do.....	Do.
.....	.....	...do...	5,000.00	5,000.00	...do...	.....do.....	Do.
.....	.....	...do...	5,000.00	5,000.00	...do...	.....do.....	Do.

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TABLE V.—*Statement of floating plant owned by the United States and*

NEWPORT, R. I.

Name or number.	Class and description.	Tonnage.	Dimensions.			Built.	
			Length.	Width.	Depth.	When.	Where.
			Ft. in.	*Ft. in.*	*Ft. in.*		
U. S. Engineers	Naphtha launch	3.04	30 0	6 5	3 1	1893	Morris Heights, N. Y
Cora	Steam dispatch boat	198.70	140 0	23 0	12 0	1885	Brooklyn, N. Y.
Gedney	Hydraulic dredge	751.00	156 6	36 6	15 6	1887	Wilmington, Del.

NEW YORK, N. Y., FIRST DISTRICT.

Argus	Steam tug	80.00	84 5	15 5	9 0	1889	New York, N. Y.
Nimrod	do	103.00	100 0	21 0	9 0	1890	Noank, Conn.
Lamont	do	206.00	100 0	22 0	12 6	1895	Camden, N. J.
Lookout	Naphtha launch	1.00	26 0	4 0	2 6	1896	New York, N. Y.
Scout	Steam tug	150.00	96 0	20 0	11 5	1896	Camden, N. J.
Vigilant	do	208.00	112 5	22 0	12 0	1900	Elizabeth, N. J.
Cerberus	do	206.00	100 0	22 0	12 6	1905	Camden, N. J.
Hudson	Drill scow		71 0	24 0	7 0	1879	Brooklyn, N. Y.
No name	Pile driver with engine and air compressor.		43 0	20 0	3 9		
No. 1	Rowboat		15 0	4 4	1 6	1894	Albany, N. Y.
No. 2	Skiff		15 0	4 0	1 3	1904	Castleton, N. Y.
No. 3	do		15 9	5 6	1 6	1903	do
No. 4	Rowboat		16 0	4 6	2 2	1907	Albany, N. Y.
Impatient	Steam yacht	39.00	75 0	12 6	6 6	1893	Hollyoak, Del
Marie	Gasoline launch		29 0	8 0	4 0	1906	Unknown
No. 5	Rowboat		15 0	4 0	1 6	1907	New York, N. Y.
No. 6	do		15 0	4 0	1 6	1907	do
No. 7	do		15 0	4 0	1 6	1908	do
No. 8	do		15 0	4 0	1 6	1909	do
Sweep	Sweep scow	85.00	56 3	26 2	6 0	1908	New London, Conn.

NEW YORK, N. Y., SECOND DISTRICT.

Atlantic	Hydraulic dredge	2,674.00	288 0	47 6	25 0	1904	Sparrows Point, Md.
Manhattan	do	2,665.00	288 0	47 6	25 0	1904	do
Raritan	do	2,930.00	290 0	47 6	28 0	1908	do
Navesink	do	2,931.00	290 0	47 6	28 0	1908	do
Manisees	Steamer	157.00	102 0	22 0	9 0	1898	Noank, Conn.
Engineer	Tug	75.00	91 0	18 0	7 6	1876	New York, N. Y.
General Ingalls	Steam launch	8.00	43 0	8 2	4 8	1896	Jersey City, N. J.
Schuyler	Gasoline launch		25 0	5 8	1-10	1902	Brooklyn, N. Y.

[a] In purchase of steam tug Scout.
[b] Very good.
[c] Needs new engines and boiler.
[d] Very poor.

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employed in the Engineer Department at Large on June 30, 1910—Continued.

NEWPORT, R. I.

Purchased. When.	Purchased. Where.	Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
1893	Morris Heights, N. Y.	Wood.	$2,090.00	$400.00	Poor..	Southern coast of Massachusetts and Rhode Island.	Rivers and harbors.
1893	Brooklyn, N. Y.	...do...	13,900.00	31,500.00	Good..	.....do.....	Do.
1892	New York, N. Y.	...do...	72,500.00	33,000.00	Fair...	.....do.....	Do.

NEW YORK, N. Y., FIRST DISTRICT.

.....	.....	Iron...	$21,250.00	$1,000.00	Bad...	New York Harbor.	Prevention of deposits, Harbor of New York.
1890	New York, N. Y.	Wood.	37,000.00	20,000.00	Fair...	.....do.....	Do.
.....	.....	Steel..	37,500.00	37,000.00	(b)	.....do.....	Do.
1896	New York, N. Y.	Wood.	(a)	500.00	Good..	.....do.....	Do.
.....	.....	Steel..	35,550.00	30,000.00	...do...	.....do.....	Do.
.....	.....	...do...	44,700.00	35,000.00	Good c.	.....do.....	Do.
.....	.....	...do...	43,740.57	43,000.00	(b)	.....do.....	Do.
.....	.....	Wood.	15,000.00	2,000.00	Poor..	Harlem River and Newtown Creek, N. Y.	East River and Hell Gate, N. Y.
1906	Albany, N. Y.	...do...	3,000.00	1,000.00	...do...	Hudson River, N. Y.	Hudson River, N. Y.
1899	.....do.....	...do...	50.00	5.00	(d)	.....do.....	Do.
1906	.....do.....	...do...	15.00	5.00	(d)	.....do.....	Do.
1906	.....do.....	...do...	17.00	5.00	Poor..	.....do.....	Do.
1907	.....do.....	...do...	80.00	70.00	Good..	.....do.....	Do.
1907	New York, N. Y.	...do...	9,000.00	4,500.00	...do...	River and harbor works, New York District, No. 1.	River and harbor works, New York District, No. 1.
1907	.....do.....	...do...	1,100.00	1,500.00	...do...	.....do.....	Do.
1907	.....do.....	...do...	110.00	100.00	...do...	.....do.....	Do.
1907	.....do.....	...do...	110.00	100.00	...do...	.....do.....	Do.
1908	.....do.....	...do...	100.00	90.00	...do...	.....do.....	Do.
1909	.....do.....	...do...	100.00	90.00	...do...	.....do.....	Do.
1909	.....do.....	...do...	8,058.00	7,000.00	...do...	.....do.....	Do.

NEW YORK, N. Y., SECOND DISTRICT.

1904	Sparrows Point, Md.	Steel..	c$341,577.00	$260,000.00	Good..	New York Harbor, N. Y.	New York Harbor.
1904	.....do.....	...do...	c341,577.00	260,000.00	...do...	.....do.....	Do.
1908	.....do.....	...do...	c397,600.00	350,000.00	...do...	.....do.....	Do.
1908	.....do.....	...do...	c393,340.00	350,000.00	...do...	.....do.....	Do.
1900	Peacedale, R. I..	Wood.	18,500.00	15,000.00	...do...	.....do.....	New York Harbor, two-thirds; Gowanus Bay, one-third.
.....	New York, N. Y.	...do...	25,000.00	5,000.00	Fair...	.....do.....	New York Harbor.
1896	Jersey City, N. J.	...do...	4,500.00	1,800.00	...do...	.....do.....	Do.
1902	Brooklyn, N. Y.	...do...	1,110.80	850.00	Good..	Long Island Sound	Fortifications, Forts Schuyler Slocum, and Totten, N. Y.

a Figures heretofore reported were original contract cost for construction, cost of various subsidiary contracts having been omitted.

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TABLE V.—*Statement of floating plant owned by the United States and*

NORFOLK, VA.

Name or number.	Class and description.	Tonnage.	Dimensions.			Built.	
			Length.	Width.	Depth.	When.	Where.
			Ft. in.	*Ft. in.*	*Ft. in.*		
No name	Floating pump		60 0	24 0	6 0	1902	Richmond, Va.
McGregor [a]	Steam yacht	53.00	79 6	14 7	7 1	1897	Middletown, Conn.
Roanoke	Stern-wheel snag boat	124.36	115 0	24 0	4 10	1895	Petersburg, Va.
Hospital Point	Gasoline launch		15 5	4 0	2 0	1904	Detroit, Mich.
Lake Drummond	do		24 2	6 5	2 7	(b)	Not known.

OSWEGO, N. Y.

Frontenac	Dredge		76 0	26 0	7 0	1891	Oswego.
No. 1	Derrick scow		74 0	26 0	5 0	1892	do.
No. 2	do		76 0	26 0	6 3	1905	do.
No. 3	Material scow		68 0	20 0	5 6	1905	do.
No. 4	do		68 0	20 0	5 6	1905	do.
No. 5	do		68 0	20 0	5 6	1907	do.
No. 6	do		40 0	12 8	3 2	1898	do.
No. 7	Dump scow		75 0	20 0	6 6	1907	do.
No. 8	do		75 0	20 0	6 6	1907	do.
No. 9	Derrick scow		150 0	36 0	8 9	1908	do.
No. 10	Stone scow		130 0	36 0	8 9	1908	do.
No. 11	do		130 0	36 0	8 9	1908	do.
No. 12	do		100 0	32 0	9 4	1909	do.
No. 13	Derrick scow		100 0	32 0	9 4	1909	do.
Ontario	Launch		27 0	6 0	3 0	1904	do.
Brewerton [c]	Tug		58 4	15 7	8 11	1893	Benton Harbor, Mich.

PHILADELPHIA, PA.

Delaware	Suction dredge	2,750.00	315 0	52 0	22 6	1905	Sparrows Point, Md.
Cataract	Rehandling machine	750.00	140 6	40 4	10 7	1905	Baltimore, Md.
Vidette	Tug	99.00	99 1	21 0	10 0	1898	do.
Philadelphia	do	55.00	67 0	16 0	7 6	1894	Wilmington, Del.
Uncle Sam	Centrifugal pump dredge	450.00	85 0	34 0	7 0	1899	Jersey City, N. J.
Schuylkill	Naphtha launch	16.09	54 0	12 0	3 6	1901	Philadelphia, Pa.
Dorothy	do	1.5	22 2	6–11½	0–16½	1906	Paulsboro, N. J.
Scorpion	do	1.5	23 0	7 0	4 0		
Observer	Quarter boat	25.00	50 0	20 0	0–10	1896	Camden, N. J.
Hell Gate	Dredge	720.00	110 0	35 0	12 0	1869	New York, N. Y.
Gen. John Newton	Drill scow	750.00	127 0	58 0	9 6	1869	Brooklyn, N. Y.
Gen. A. A. Humphreys.	Tug	50.09	71 6	16 0	7 0	1880	Tottenville, N. Y.
No. 3	Dump scow	330.00	78 0	26 0	9 0	1889	Brooklyn, N. Y.
No. 4	do	100.00	65 0	20 0	7 3	1879	New York, N. Y.
No. 5	Derrick scow	50.00	38 0	18 0	6 0	1875	Brooklyn, N. Y.
Rattler	do	240.00	70 0	30 0	7 0	1908	Camden, N. J.
No. 1	Dump scow	572.00	110 0	30 6	11 0	1885	Brooklyn, N. Y.
No. 2	do	643.00	115 0	32 6	12 0	1890	do.
Mary	Lighter	15.00	37 0	13–8½	4 0	1895	Camden, N. J.
Delaware	Naphtha launch	2.00	20 2	6 8	3 2	1908	do.

[a] Formerly 92806.

[b] Not known.

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employed in the Engineer Department at Large on June 30, 1910—Continued.

NORFOLK, VA.

Purchased. When.	Purchased. Where.	Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
1904	Richmond, Va..	Wood.	$4,800.00	$1,000.00	Bad...	Out of commission.	Fort Monroe, Va.
1903	Baltimore, Md..	...do...	10,000.00	7,000.00	Good..	Hampton Roads and tributaries.	Improving Hampton Roads, Va.
.....	.....	...do...	15,424.00	6,000.00	...do...	Out of commission.	Improving Roanoke River, N.C.
.....	.....	...do...	448.00	50.00	Fair...	.....do.....	Improving harbor at Norfolk, Va.
1909	Norfolk, Va.....	...do...	300.00	50.00	Bad...	.....do.....	Survey, intracoastal waterway.

OSWEGO, N. Y.

1891	Oswego.....	Wood.	$14,650.00	$6,000.00	Fair...	Charlotte, N. Y...	
.....	.....	...do...	2,000.00	1,800.00	Good..	Great Sodus, N. Y.	
.....	.....	...do...	5,000.00	4,000.00	...do...	Little Sodus, N. Y	
.....	.....	...do...	1,250.00	1,000.00	...do...	Great Sodus, N. Y.	
.....	.....	...do...	1,250.00	1,000.00	...do...	.....do.....	
.....	.....	...do...	1,500.00	1,200.00	...do...	Little Sodus, N. Y.	
.....	.....	...do...	450.00	150.00	Poor..	Oswego, N. Y.....	
.....	.....	...do...	3,100.00	2,600.00	Good..	Charlotte, N. Y...	
.....	.....	...do...	3,100.00	2,600.00	...do...	.....do.....	
.....	.....	...do...	10,500.00	9,500.00	...do...	Oswego, N. Y.....	
.....	.....	...do...	5,500.00	5,000.00	...do...	.....do.....	
.....	.....	...do...	5,500.00	5,000.00	...do...	.....do.....	
.....	.....	...do...	6,500.00	6,500.00	...do...	.....do.....	
.....	.....	...do...	9,500.00	9,500.00	...do...	.....do.....	
.....	.....	...do...	525.00	350.00	...do...	.....do.....	
1909	Bay City, Mich..	...do...	2,950.00	8,500.00	...do...	.....do.....	

PHILADELPHIA, PA.

1905	Sparrows Point, Md.	Steel hull.	$392,134.13	$280,000.00	Good..	Delaware River...	Delaware River, Pa. and N. J.
1906	Baltimore, Md..	Wood.	80,600.00	65,000.00	...do...	.....do.....	Do.
1898	.....do.....	Steel hull.	35,100.00	25,000.00	...do...	.....do.....	Harbor of refuge, Delaware Bay, Del.
1894	Wilmington, Del.	...do...	15,997.51	9,500.00	...do...	.....do.....	Philadelphia Harbor.
1904	Jersey City, N.J.	Wood.	18,855.94	16,000.00	...do...	.....do.....	Delaware River, Pa. and N. J.
1901	Philadelphia, Pa.	...do...	6,000.00	4,000.00	...do...	.....do.....	Do.
1907	Camden, N. J....	...do...	275.00	220.00	...do...	.....do.....	Do.
1909	Port Penn, Del..	...do...	200.00	175.00	...do...	.....do.....	Do.
1896	Camden, N. J....	...do...	1,161.00	800.00	...do...	.....do.....	Do.
1889	New York, N.Y.	...do...	25,000.00	18,400.00	...do...	.....do.....	East River and Hell Gate, N. Y.
.....	.....	...do...	100,000.00	10,000.00	Obsolete.	.....do.....	Do.
.....	.....	...do...	12,000.00	7,000.00	Good..	.....do.....	Do.
.....	.....	...do...	4,000.00	2,000.00	Fair...	.....do.....	Do.
.....	.....	...do...	2,000.00	1,500.00	...do...	.....do.....	Do.
.....	.....	...do...	3,000.00	1,750.00	Good..	.....do.....	Do.
1908	Camden, N. J....	...do...	7,187.28	6,800.00	...do...	.....do.....	Delaware River, Pa. and N. J.
1905	New York, N.Y.	...do...	4,600.00	2,200.00	Fair...	.....do.....	Do.
1905	.....do.....	...do...	5,200.00	3,500.00	...do...	.....do.....	Do.
1904	Philadelphia, Pa.	...do...	300.00	150.00	Poor..	.....do.....	Do.
1908	Camden, N. J....	...do...	450.00	300.00	Fair...	.....do.....	Do.

c Formerly the tug Arthur Jones, which was rebuilt at Oswego during season of 1909 and 1910, and name changed to Brewerton under authority of office of the Chief of Engineers, dated April 29, 1910, 65210/5. Carried on property returns incorrectly as the Oswego. It will be corrected on the next property return.

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TABLE V.—*Statement of floating plant owned by the United States and*

PITTSBURG, PA.

Name or number.	Class and description.	Tonnage.	Dimensions.			Built.	
			Length.	Width.	Depth.	When.	Where.
			Ft. in.	Ft. in.	Ft. in.		
Albatross	Naphtha launch	1	30 0	5 10	2 6	1887	New York, N. Y.
Luson	do	4	53 0	9 4	4 6	1901	do
No. 1	Dipper dredge		85 0	32 0	6 9	1903	Jeffersonville, Ind.
No. 2	do		86 6	30 0	5 0	1905	Parkersburg, W. Va.
Slackwater [b]	Stern-wheel repair boat.	98	120 0	26 4	4 3	1902	Marietta, Ohio.
Swan [c]	Stern-wheel snag and repair boat.	154	159 0	31 4	5 0	1903	Pittsburg, Pa.
T. P. Roberts	Stern-wheel towboat	80	115 0	22 8	4 0	1906	Marietta, Ohio.
Wenonah [d]	Steam launch	10	65 0	8 0	5 0	1894	Pittsburg, Pa.
Deluge	Steam pump boat		80 0	21 0	4 2	1898	Elizabeth, Pa.
Mary Ann	Crane boat		115 0	26 10	3 0	1892	Monongahela, Pa.
No. 1	Derrick boat		48 0	22 0	3 9	1899	do
No. 2	do		70 0	26 0	3 8	1902	United States boat yard, Lock 4, Pa.
No. 3	do		70 0	26 0	3 6	1905	do
Ohio No. 1	do		70 0	30 0	3 8	1910	do
Nos. 1 and 2	Dump scows		70 2	20 10	6 9	1902	Cincinnati, Ohio.
Nos. 3 and 4	do		70 2	20 10	6 9	1905	Elizabeth, Pa.

[d] Secondhand. [b] Formerly No. 116011. [c] Formerly U. S. Engineer Gen. Theodore Schwan.

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employed in the Engineer Department at Large on June 30, 1910—Continued.

PITTSBURG, PA.

Purchased. When.	Purchased. Where.	Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
1892	Cincinnati, Ohio.	Wood.	$740.00	$700.00	Fair...	Laid up, United States boat yard, Lock 4, Pa.	Operating and care of canals and other works of navigation, indefinite, Monongahela River.
1901	New York, N. Y.	...do...	4,660.00	2,300.00	Good..	Monongahela, Allegheny, and Ohio rivers.	Improving harbor at Pittsburg, Pa.
1903	Pittsburg, Pa...	...do...	17,565.00	6,000.00	Bad...	Monongahela River.	Improving Monongahela River, W. Va., Locks 3, 6, etc.
1907	.....do.....	...do...	[a] 17,000.00	17,000.00	Fair...	Monongahela, Allegheny, and Ohio rivers.	Operating and care of canals and other works of navigation, indefinite, Monongahela and Ohio rivers.
1902	.....do.....	...do...	13,500.00	10,000.00	...do...	Monongahela and Ohio rivers.	Operating and care of canals and other works of navigation, indefinite, Monongahela River.
1903	.....do.....	Steel..	51,800.00	30,000.00	...do...	.....do.....	Improving Monongahela River, W. Va., Locks 3, 6, etc.
1906	.....do.....	Wood.	17,370.00	14,500.00	...do...	Monongahela, Allegheny, and Ohio rivers.	Improving Monongahela River, W. Va., Locks 10-15, and operating and care, etc., Monongahela River.
1900	.....do.....	Steel..	[c] 6,000.00	1,250.00	...do...	Ohio, Allegheny, and Monongahela rivers.	Operating and care of canals and other works of navigation, indefinite, Ohio River.
1898	.....do.....	Wood.	6,000.00	2,000.00	...do...	Monongahela River.	Operating and care of canals and other works of navigation, indefinite, Monongahela River.
1897	.....do.....	...do...	[a] 11,000.00	250.00	Bad...	.....do.....	Do.
1899	.....do.....	...do...	2,800.00	900.00	Fair...	.....do.....	Do.
.....	.....	...do...	3,300.00	2,200.00	...do...	.....do.....	Do.
.....	.....	...do...	3,500.00	2,250.00	...do...	.....do.....	Do.
.....	.....	...do...	6,785.00	6,785.00	Good..	Locks 1-6, Ohio River.	Operating and care of canals and other works of navigation, indefinite, Ohio River.
1902	Pittsburg, Pa...	...do...	[f] 3,600.00	[f] 800.00	Bad...	Laid up, Lock 4, Monongahela River.	Improving Monongahela River, W. Va., Locks 3, 6, etc.
1907	.....do.....	...do...	[c f] 3,000.00	[f] 1,800.00	Fair...	Monongahela, Allegheny, and Ohio rivers.	Operating and care of canals and other works of navigation, indefinite, Monongahela and Ohio rivers.

[a] Formerly No. 81473. [c] Estimated. [f] Each.

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TABLE V.—*Statement of floating plant owned by the United States and*

PITTSBURG, PA.—Continued.

Name or number.	Class and description.	Tonnage.	Dimensions.			Built.	
			Length.	Width.	Depth.	When.	Where.
			Ft. in.	Ft. in.	Ft. in.		
Nos. 5 and 6	Dump scows		70 2	20 10	6 9	1907	United States boat yard, Lock 4, Pa.
No. 1	Pile-driver boat		50 0	26 0	3 6	1904	do
No. 2	do		50 0	26 0	3 6	1906	do
No. 3	do		50 6	20 9	3 3		
No. 1	Quarter boat		85 0	22 0	3 6	1902	United States boat yard, Lock 4, Pa.
No. 2	do		76 0	16 0	3 0	1904	Gallipolis, Ohio
	Maneuvering		53 8	16 0	3 0	1895	Pittsburg, Pa.
	do		56 0	18 0	3 3	1902	do
	do		56 0	18 0	3 3	1904	United States boat yard, Lock 4, Pa.
	do		60 0	22 0	3 8	1906	do
	do		60 0	22 0	3 8	1906	Glenoeborn, Pa.
	do		60 0	22 0	3 8	1906	Legionville, Pa.
	do		60 0	22 0	3 8	1906	Merrill, Pa.
	Flat		20 0	5 6	1 6	1900	do
	do		24 0	9 0	1 7	1906	United States boat yard, Lock 4, Pa.
	do		28 0	8 0	1 6	1906	Vanport, Pa.

a Each. b Secondhand.

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employed by the Engineer Department at Large on June 30, 1910—Continued.

PITTSBURG, PA.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
When.	Where.						
.....	.....	Wood.	[a] $3,500.00	[a] $2,500.00	Good..	Lock 5, Monongahela River.	Operating and care of canals and other works of navigation, indefinite, Monongahela River.
.....	.....	...do...	3,500.00	2,000.00	Fair...	.....do.....	Improving Monongahela River, Pa., Lock 2.
.....	.....	...do...	3,750.00	2,700.00	...do...	Lock 1, Monongahela River.	Operating and care of canals and other works of navigation, indefinite, Monongahela River.
1907	Pittsburg, Pa...	...do...	[b] 2,000.00	600.00	Bad...	Lock 4, Monongahela River, laid up.	Dam at Herrs Island, Allegheny River, near Pittsburg, Pa., Dams Nos. 2 and 3.
.....	.....	...do...	3,150.00	2,000.00	Good..	Lock 1, Ohio River, laid up.	Operating and care of canals and other works of navigation, indefinite, Monongahela River.
1904	Pittsburg, Pa...	...do...	[b] 625.00	300.00	Fair...	Lock 5, Monongahela River.	Improving Monongahela River, Pa., Lock 2.
.....	.....	Steel..	[c] 5,000.00	1,250.00	Bad...	Lock 1, Ohio River.	Operating and care of canals and other works of navigation, indefinite, Ohio River.
.....	.....	Wood.	4,000.00	2,400.00	Fair...	Lock 1, Allegheny River.	Dam at Herrs Island, Allegheny River, near Pittsburg, Pa., Dam No. 1.
.....	.....	...do...	4,600.00	2,600.00	...do...	Lock 6, Ohio River.	Improving Ohio River below Pittsburg, Pa., Dam No. 6.
.....	.....	...do...	5,600.00	4,200.00	Good..	Lock 2, Ohio River.	Improving Ohio River below Pittsburg, Pa., Dam No. 2.
.....	.....	...do...	6,000.00	4,800.00	...do...	Lock 3, Ohio River.	Improving Ohio River below Pittsburg, Pa., Dam No. 3.
.....	.....	...do...	6,000.00	4,800.00	...do...	Lock 4, Ohio River.	Improving Ohio River below Pittsburg, Pa., Dam No. 4.
.....	.....	...do...	4,250.00	3,500.00	...do...	Lock 5, Ohio River.	Improving Ohio River below Pittsburg, Pa., Dam No. 5.
.....	.....	...do...	80.00	10.00	Bad...	Lock 1, Ohio River.	Improving Ohio River below Pittsburg, Pa., Dam No. 6.
.....	.....	...do...	120.00	85.00	Good..	Lock 8, Monongahela River.	Operating and care of canals and other works of navigation, indefinite, Monongahela River.
1906	Pittsburg, Pa...	...do...	80.00	50.00	Fair...	Lock 2, Ohio River.	Improving Ohio River below Pittsburg, Pa., Dam No. 4.

[c] Estimated; hull, $1,988.

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TABLE V.—*Statement of floating plant owned by the United States and*

PITTSBURG, PA.—Continued.

Name or number.	Class and description.	Tonnage.	Dimensions.			Built.	
			Length.	Width.	Depth.	When.	Where.
			Ft. in.	Ft. in.	Ft. in.		
No. 2 (continued)....	Flat.....	.....	30 0	10 0	3 0	1902	Merrill, Pa.....
	.....do.....	.....	35 0	14 0	2 0	1906	Coraopolis, Pa.....
	.....do.....	.....	36 0	12 0	2 0	1909	U. S. boat yard, Lock 4, Pa.
	Flats (6).....	.....	38 0	11 0	2 0	1904	.....do.....
	Flat.....	.....				1909	
	Flats (2).....	.....	41 0	12 0	2 6	1907	Coraopolis, Pa.....
	Flat.....	.....	45 0	12 0	2 1	1905	U. S. boat yard, Lock 4, Pa.
	.....do.....	.....	46 0	11 0	2 6	.....	.....do.....
	.....do.....	.....	46 6	11 0	1 8	.....	.....do.....
	.....do.....	.....	46 6	11 0	1 10	.....	.....do.....
	.....do.....	.....	46 8	11 0	2 1	.....	.....do.....
	.....do.....	.....	47 0	11 0	2 1	.....	.....do.....
	Flats (2).....	.....	48 0	11 0	2 0	1909	.....do.....
	Flat.....	.....	48 0	11 0	2 1	1897	.....do.....
	.....do.....	.....				1901	
	Flats (2).....	.....	48 0	12 0	2 6	1908	.....do.....
	Flat.....	.....	48 0	12 0	3 0	1908	.....do.....
	.....do.....	.....	48 0	12 0	2 4	1908	.....do.....
	.....do.....	.....	50 0	11 0	2 2	1906	Coraopolis, Pa.....
	.....do.....	.....	50 0	12 0	3 0	1906	.....do.....
	Flats (2).....	.....	80 0	16 0	4 8	1907	Pittsburg, Pa.....

a Each.

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employed in the Engineer Department at Large on June 30, 1910—Continued.

PITTSBURG, PA.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
When.	Where.						
.....	.....	Wood.	$150.00	$60.00	Fair...	Lock 5, Ohio River	Improving Ohio River below Pittsburg, Pa., Dam No. 5.
1906	Pittsburg, Pa...	...do...	100.00	50.00	...do...	Lock 1, Allegheny River.	Operating and care of canals and other works of navigation, indefinite, Ohio River.
.....	.....	...do...	184.00	170.00	Good..	Lock 3, Monongahela River.	Operating and care of canals and other works of navigation, indefinite, Monongahela River.
.....	.....	...do...	a 175.00 187.00	a 75.00 187.00	..do...	Locks 9 to 15, Monongahela River	Do.
1907	Pittsburg, Pa...	...do...	a 215.00	a 75.00	Fair...	Locks 2 and 3 Allegheny River.	Operating and care of canals and other works of navigation, indefinite, Allegheny River.
.....	.....	...do...	205.00	40.00	Bad...	Lock 1, Ohio River	Improving Ohio River below Pittsburg, Pa., Dam No. 6.
1897	Pittsburg, Pa...	...do...	175.00	5.00	...do...	Lock 5, Monongahela River.	Operating and care of canals and other works of navigation, indefinite, Monongahela River.
1897	.....do.....	...do...	190.00	40.00	...do...	Lock 4, Monongahela River.	Do.
1897	.....do.....	...do...	190.00	150.00	Good..	Lock 1, Monongahela River.	Do.
1897	.....do.....	...do...	205.00	5.00	Bad...	Lock 5, Monongahela River.	Do.
1897	.....do.....	...do...	200.00	45.00	Fair...	Lock 7, Monongahela River.	Do.
.....	.....	...do...	204.00 196.00	190.00 185.00	Good..	Locks 6 and 4, Monongahela River.	Do.
.....	.....	...do...	220.00 225.00	10.00 20.00	Bad...	Locks 4 and 5, Monongahela River.	Do.
.....	.....	...do...	a 245.00	200.00 125.00	Good.. Fair...	Locks 3 and 4, Ohio River.	Operating and care of canals and other works of navigation, indefinite, Ohio River.
.....	.....	...do...	245.00	200.00	Good..	Lock 6, Ohio River	Do.
.....	.....	...do...	210.00	150.00	...do...	Lock 1, Monongahela River.	Operating and care of canals and other works of navigation, indefinite, Monongahela River.
1906	Pittsburg, Pa...	...do...	150.00	45.00	Fair...	Lock 1, Ohio River	Improving Ohio River below Pittsburg, Pa., Dam No. 4.
1906	.....do.....	...do...	150.00	75.00	...do...	Lock 2, Ohio River	Operating and care of canals and other works of navigation, indefinite, Ohio River.
1907	.....do.....	...do...	a b 700.00	300.00 5.00	Fair... Bad...	Lock 1, Ohio River Lock 4, Monongahela River.	Dam at Herrs Island, Allegheny River, near Pittsburg, Pa., Dam No. 2.

b Secondhand.

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TABLE V.—*Statement of floating plant owned by the United States and*

PITTSBURG, PA.—Continued.

Name or number.	Class and description.	Tonnage.	Dimensions.			Built.	
			Length.	Width.	Depth.	When.	Where.
			Ft. in.	*Ft. in.*	*Ft. in.*		
No. 2—(continued)...	Flat.....	.....	90 0	16 0	6 0	.....	Pittsburg, Pa.....
	Flats (4).....	.....	90 0	18 0	6 0	1902	U. S. boat yard, Lock 4, Pa.
	Flat.....	.....	90 0	18 0	6 0	1908	.....do.....
	Flats (2).....	.....	90 6	16 0	6 0	1899	Roscoe, Pa.....
	Flats (3).....	.....	100 0	20 0	6 0	1902	U. S. boat yard, Lock 4, Pa.
	Flats (2).....	.....	100 0	24 0	6 0	1905	.....do.....
	Flat.....	.....	100 6	20 0	6 0	1905	.....do.....
	Skiffs (2).....	.....	15 0	.....	.....	.....	.....
	Skiffs (13).....	.....	16 0	.....	.....	.....	.....
	Skiffs (14).....	.....	18 0	.....	.....	.....	.....
	Skiffs (7).....	.....	20 0	.....	.....	.....	.....
	Skiffs (3).....	.....	22 0	.....	.....	.....	.....
	Skiffs (4).....	.....	24 0	.....	.....	.....	.....

PORTLAND, ME.

Norka.....	Launch (motor).....	.....	67 0	14 0	6 1	1905	New York City.....

PORTLAND (OREG.) FIRST DISTRICT.

Arago.....	Steam tug.....	91.00	89 10	18 0	9 0	1905	Portland, Oreg.....
Umatilla.....	Self-propelling dipper dredge.	481.00	159 9	34 4	5 1	1908	Celilo, Oreg.....
Wallowa.....	.....do.....	229.00	125 0	25 6	5 0	1904	Riparia, Wash.....

a Secondhand.

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employed in the Engineer Department at Large on June 30, 1910—Continued.

PITTSBURG, PA.—Continued.

Purchased. When.	Purchased. Where.	Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
1899	.....	Wood.	[a] $490.00	$900.00	Good..	Lock 5, Monongahela River.	Operating and care of canals and other works of navigation, indefinite, Monongahela River.
.....	.....	...do...	[b] 1,300.00	2,800.00	3 fair..	Locks 4, 5, and 6, Monongahela River.	Do.
					1 good.	Lock 1, Monongahela River.	
.....	.....	...do...	1,300.00	1,100.00	Good..	Lock 5, Monongahela River.	Do.
1899	Roscoe, Pa.....	...do...	[b] 750.00	250.00	Fair...	Lock 2, Ohio River	Do.
				400.00	Good..	Lock 1, Ohio River	
.....	.....	...do...	[b] 1,600.00	340.00	...do ..	Locks 5, 4, and 1, Monongahela River.	Do.
.....	.....	...do...	[b] 1,700.00	900.00	..do ..	Locks 4 and 5, Monongahela River.	Do.
				1,250.00			
.....	.....	...do...	1,600.00	900.00	Fair...	Lock 1, Ohio River	Improving Ohio River below Pittsburg, Pa., Dam No. 3.
1907	Pittsburg, Pa....	...do...	48.00	28.00	33 good, 10 fair.	Monongahela, Allegheny and Ohio rivers.	Improving Monongahela River, Pa., Lock 5; operating and care of canals and other works of navigation, indefinite; Monongahela River; Ohio River; Allegheny River.
1908							
1905	....do.....	...do...	312.00	170.00			
1908							
1905	....do.....	...do...	378.00	200.00			
1910							
1905	....do.....	...do...	210.00	100.00			
1910							
1904	....do.....	...do...	94.00	32.00			
1907							
1907	....do.....	...do...	160.00	110.00			
1909							

PORTLAND, ME.

1905	New York City..	Wood.	$12,500.00	$7,500.00	Good..	Coast of Maine and New Hampshire.	River and harbor improvements.

PORTLAND (OREG.) FIRST DISTRICT.

.....	.....	Wood.	$24,490.00	$15,000.00	Good..	Fort Stevens, Oreg.	Improving Tillamook Bay and bar, Oreg.; Coquille River, Oreg., from Coquille to mouth; entrance to Coos Bay and Harbor, Oreg.; Yaquina Bay, Oreg.; Siuslaw River, Oreg.
.....	.....	...do..	55,245.00	50,000.00	...do..	Columbia River above Celilo Falls to mouth of Snake River.	Improving Columbia River and tributaries above Celilo Falls to mouth of Snake River, Oreg. and Wash.
.....	.....	...do..	32,755.00	21,000.00	...do..	Snake River.....	Improving Upper Columbia and Snake rivers, Oreg., Wash., and Idaho.

[b] Each.

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TABLE V.—*Statement of floating plant owned by the United States and*

PORTLAND (OREG.) FIRST DISTRICT—Continued.

Name or number.	Class and description.	Tonnage.	Dimensions.			Built.	
			Length.	Width.	Depth.	When.	Where.
			Ft. in.	*Ft. in.*	*Ft. in.*		
No. 3	Combined suction and dipper dredge.	200.00	60 0	30 0	5 0	1906	Cascade Locks, Oreg.
Jennie	Gasoline launch	5.00	30 0	8 0	3 2	1907	Portland, Oreg.
Margaretta	Naphtha launch	(a)	21 0	5 6	2 6	1892	Tacoma, Wash.
No name or number	Flat boat	7.00	30 0	10 0	2 9	1903	Tillamook, Oreg.
Do	Dredge scow	200.00	62 0	28 0	5 6	b1890	Coquille, Oreg.
Do	do	84.00	70 0	30 0	3 8	1900	Tillamook, Oreg.
Do	Wood scow	57.00	60 0	24 0	4 0	1900	Portland, Oreg.
Do	do	10.00	38 0	12 0	3 0	1905	Tillamook, Oreg.
Do	Coal scow	100.00	68 0	24 0	5 0	1908	Beverly, Wash.
No. 8	do	80.00	64 0	22 0	4 0	1893	Coos Bay, Oreg.
No. 4	Stone scow	275.00	90 0	28 0	6 0	1891	do
No. 5	do	275.00	90 0	28 0	6 0	1893	do
No. 6	do	275.00	90 0	28 0	6 0	1893	do
No. 7	do	275.00	90 0	28 0	6 0	1893	do
No. 8	Stone barge	270.00	89 1	27 1	6 5	1889	Yaquina Bay, Oreg.
No. 9	do	270.00	89 1	27 1	6 5	1889	do
No. 10	do	270.00	89 6	27 0	6 5	1889	do
No. 10	Wood scow	30.00	60 0	22 0	3 6	1891	Coos Bay, Oreg.

PORTLAND (OREG.) SECOND DISTRICT.

A	Model barge	500.00	120 0	32 0	8 0	1902	Portland, Oreg.
B	do	500.00	120 0	32 0	8 0	1902	do
Scow No. 1	Broad-horn barge	186.00	90 0	26 0	4 0	1902	do

a Unknown.

b Rebuilt in 1903.

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employed in the Engineer Department at Large on June 30, 1910—Continued.

PORTLAND (OREG.) FIRST DISTRICT—Continued.

Purchased. When.	Purchased. Where.	Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
.....	.....	Wood.	$6,056.00	$4,000.00	Good..	Cascade Locks, Oreg.	Operating and care of canals and other works of navigation, indefinite; canal at Cascades, Columbia River, Oreg.
.....	.....	...do..	1,550.00	1,000.00	...do ..	Tillamook, Oreg..	Improving Tillamook Bay and bar, Oreg.
1892	Tacoma, Wash..	...do..	900.00	50.00	Unserviceable.	Out of commission.	Improving entrance to Coos Bay and Harbor, Oreg.
.....	.....	...do..	250.00	50.00	Poor..	Tillamook, Oreg...	Improving Tillamook Bay and Bar, Oreg.
.....	.....	...do...	c 3,000.00	25.00	Unserviceable.	Out of commission.	Improving Coquille River, Oreg., from Coquille to mouth.
1900	Tillamook, Oreg.	...do...	c 2,700.00	400.00	Poor..	Tillamook, Oreg...	Improving Tillamook Bay and Bar, Oreg.
1900	Portland, Oreg..	...do...	c 750.00	40.00	Unserviceable.	Out of commission.	Do.
1906	Tillamook, Oreg.	...do...	c 50.00	25.00	Fair...	Tillamook, Oreg...	Do.
1910	Kennewick, Wash.	...do...	(a)	150.00	Good .	Columbia River above Celilo Falls to mouth of Snake River.	Improving Columbia River and tributaries above Celilo Falls to mouth of Snake River, Oreg. and Wash.
.....	.....	...do...	c 1,000.00	10.00	Unserviceable.	Out of commission	Improving entrance to Coos Bay and Harbor, Oreg.
.....	.....	...do...	c 2,000.00	25.00	...do...	.....do.....	Do.
.....	.....	...do...	c 2,000.00	25.00	...do...	.....do.....	Do.
.....	.....	...do...	c 2,000.00	25.00	...do...	.....do.....	Do.
.....	.....	...do...	c 2,000.00	25.00	...do...	.....do.....	Do.
.....	.....	...do...	2,341.00	100.00	Poor..	Mouth of Siuslaw River, Oreg.	Do.
.....	.....	...do...	2,341.00	100.00	...do...	.....do.....	Do.
.....	.....	...do...	2,341.00	100.00	...do...	.....do.....	Do.
.....	.....	...do...	150.00	10.00	Unserviceable.	Out of commission.	Do.

PORTLAND (OREG.) SECOND DISTRICT.

.....	.....	Wood.	$6,950.00	$2,000.00	Fair...	Mouth of Columbia River.	Improving mouth of Columbia River, Oreg. and Wash.
.....	.....	...do...	6,950.00	2,000.00	...do...	Columbia and lower Willamette rivers.	Improving Columbia and lower Willamette rivers below Portland, Oreg.
.....	.....	...do...	2,975.00	1,000.00	...do...	.....do.....	Improving mouth of Columbia River, Oreg. and Wash.

c Approximate.

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TABLE V.—*Statement of floating plant owned by the United States and*

PORTLAND (OREG.) SECOND DISTRICT—Continued.

Name or number.	Class and description.	Tonnage.	Dimensions.			Built.	
			Length.	Width.	Depth.	When.	Where.
			Ft. in.	*Ft. in.*	*Ft. in.*		
No name or number	Flat barge	10.00	32 0	14 0	2 6	1903	Portland, Oreg
Dolly	Gasoline launch	1.00	25 0	6 0	2 0	1899	Morris Heights, N.Y.
No name	do	3.00	25 0	8 6	3 3	1908	Wilmington, Del.
Do	Steam launch	10.00	30 3	7 10	4 0	1899	Morris Heights, N.Y.
No. 1	Quarter boat	186.00	90 0	26 0	4 0	1902	Portland, Oreg.
Mathloma	Stern-wheel snag boat	376.00	140 0	34 0	5 0	[b]1896	do
G. H. Mendell	Steam tug	94.00	91 0	18 3	8 4	1889	do
No. 1	Dipper dredge	221.00	78 0	34 0	5 6	[b]1895	do
No. 2	do	200.00	80 0	30 0	5 0	1904	do
Chinook	Hydraulic dredge	[a]4,154.00	445 0	49 0	21 6	[a]1892	Belfast, Ireland
Clatsop	do	1,100.00	180 0	38 0	20 6	1908	Newport News, Va.

ROCK ISLAND, ILL.

David Tipton	Snag boat	264.00	160 0	33 0	5 0	1900	Jeffersonville, Ind.
Coal Bluff	Towboat	175.00	128 0	25 0	4 6	1878	Ohio River
Elinor	do	175.00	125 0	25 0	4 0	1905	Jeffersonville, Ind.
Alert	do	100.00	115 0	19 6	3 10	1874	Stillwater, Minn.
Fury	do	100.00	113 0	22 0	3 10	1881	Dubuque, Iowa.
Henry Bosse	do	100.00	100 0	19 6	3 10	1881	do
Grace	do	35.00	79 0	17 0	3 3	1904	Keokuk, Iowa.

[a] Unknown.
[b] Rebuilt at Portland, Oreg., in 1906.

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employed by the Engineer Department at Large on June 30, 1910—Continued.

PORTLAND (OREG.) SECOND DISTRICT—Continued.

Purchased. When.	Purchased. Where.	Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
.....	.....	Wood.	$250.00	$100.00	Fair ..	Columbia and lower Willamette rivers.	Improving Columbia and lower Willamette rivers below Portland, Oreg.
1900	New York, N. Y.	...do...	1,273.25	300.00	Poor ..	.....do.....	Do.
.....	.....	...do...	(a)	350.00	...do...	.....do.....	Do.
.....	.....	...do...	(a)	1,000.00	Fair...	Mouth of Columbia River.	Improving mouth of Columbia River, Oreg. and Wash.
.....	.....	...do...	3,050.00	1,400.00	...do...	Columbia and lower Willamette rivers.	Improving Columbia and lower Willamette rivers, below Portland, Oreg.
.....	.....	...do...	19,560.00	13,000.00	Good..	Willamette River above Portland, Oreg.	Improving Willamette and Yamhill rivers, Oreg.
.....	.....	...do...	20,000.00	2,000.00	Poor..	Out of commission.	Improving mouth of Columbia River, Oreg. and Wash.
1903	Portland, Oreg..	...do...	2,500.00	1,800.00	Good..	Columbia and lower Willamette rivers.	Improving Clatskanie River, Oreg.
.....	.....	...do...	19,200.00	13,000.00	...do...	Willamette River above Portland, Oreg.	Improving Willamette and Yamhill rivers, Oreg.
.....	.....	Steel..	(d)	500,000.00	...do...	Mouth of Columbia River.	Improving mouth of Columbia River, Oreg. and Wash.
.....	.....	...do...	234,500.00	210,000.00	...do...	Columbia and lower Willamette rivers.	Improving Columbia and lower Willamette rivers below Portland, Oreg.

ROCK ISLAND, ILL.

1900	Jeffersonville, Ind.	Wood.	$33,286.00	$16,870.00	Good .	Upper Mississippi River and tributaries, between mouth of Missouri River and Minneapolis, Minn.	Operating snag and dredge boats on upper Mississippi, Illinois, and Minnesota Rivers.
1881	Ohio River.....	...do..	8,000.00	6,785.00	Fair ..	.....do.....	Improving Mississippi River from mouth of Ohio River to Minneapolis, Minn.; between mouth of Missouri River and Minneapolis.
1905	Jeffersonville, Ind.	...do..	17,600.00	7,215.00	Good .	.....do.....	Do.
1881	Stillwater, Minn.	...do..	6,000.00	4,870.00	Fair ..	.....do.....	Do.
1881	Dubuque, Iowa..	...do..	11,976.00	4,465.00	...do..	.....do.....	Do.
1881	.....do.....	...do..	11,976.00	4,440.00	Good ..	.....do.....	Do.
.....	.....	...do..	8,555.00	3,810.00	...do..	.....do.....	Operating and care Des Moines Rapids Canal.

a Approximate. Correct tonnage will be obtained later.
d Remodeled at San Francisco, Cal., in 1903, and at Portland, Oreg., in 1910.

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TABLE V.—*Statement of floating plant owned by the United States and*

ROCK ISLAND, ILL.—Continued.

Name or number.	Class and description.	Tonnage.	Dimensions.			Built.	
			Length.	Width.	Depth.	When.	Where.
			Ft. in.	*Ft. in.*	*Ft. in.*		
Ruth	Towboat	35.00	75 0	17 0	3 3	1895	Keokuk, Iowa
Mac	do	35.00	73 0	16 0	3 0	1891	Rock Island, Ill.
Lucia	do	15.00	68 0	12 8	3 0	1885	Keokuk, Iowa
Ada	do	15.00	68 0	11 0	3 0	1889	do
Elsie	do	15.00	67 0	13 0	3 0	1889	Jeffersonville, Ind.
Emily	do	15.00	67 0	12 0	3 0	1889	Keokuk, Iowa
Louise	do	15.00	61 0	12 0	3 0	1883	do
Myra	Gasoline launch	10.00	40 0	7 4	3 6	1902	La Crosse, Wis.
Vamos	do	5.00	31 0	7 0	2 2	1906	Redwing, Minn.
Rock Island Rapids	do	4.00	22 0	4 0	2 0	1909	Newport, Ky.
Madge	do	4.00	25 0	6 0	3 0	1904	St. Joseph, Mich.
Wasp	Motor skiff		22 0	5 0	0 8	1908	Keokuk, Iowa
Wren	do		26 0	5 3	1 3	1908	do
Jolly	do		26 0	5 3	1 3	1909	do
Folly	do		26 0	5 3	1 3	1909	do
Molly	do		26 0	5 3	1 3	1909	do
Polly	do		26 0	5 3	1 3	1909	do
Holly	do		26 0	5 3	1 3	1909	do
Dolly	do		26 0	5 3	1 3	1909	do
Sally	do		26 0	5 3	1 3	1910	do
Lark	do		26 0	5 3	1 3	1907	do
Linnet	do		26 0	5 3	1 3	1907	do
Swallow	do		20 0	5 10	1 7	1908	do
Sparrow	do		20 0	5 10	1 7	1908	do
Swift	do		20 0	5 10	1 7	1908	do
Hornet	do		26 0	5 3	1 3	1909	Keokuk, Iowa
Cobra	do		26 0	5 3	1 3	1909	do
Davy	do		24 8	5 3	1 8½	1909	Fountain City, Wis.
Dispatch	do		23 0	4 6	1 10	1909	Louisiana, Mo.
Ajax	Dipper dredge		70 0	26 0	6 0	1876	Quincy, Ill.
Vulcan	do		80 0	30 0	8 0	1883	Davenport, Iowa
Phoenix	do		80 0	30 0	8 0	1885	Metropolis, Ill.
Hecla (No. 203 and 11 pontons).	Suction dredge		120 0	26 0	5 0	1901	Fountain City, Wis.
Geyser (No. 14 and 11 pontons).	do		100 0	20 0	4 0	1893	Keokuk, Iowa

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employed in the Engineer Department at Large on June 30, 1910—Continued.

ROCK ISLAND, ILL.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
When.	Where.						
.....	.....	Wood.	$5,946.00	$5,610.00	Good.	Upper Mississippi River and tributaries, between mouth of Missouri River and Minneapolis, Minn.	Improving Mississippi River from mouth of Ohio River to Minneapolis, Minn.; between mouth of Missouri River and Minneapolis.
1893	Rock Island, Ill.	...do..	2,500.00	2,480.00	Fair ..	.....do.....	Do.
.....	.....	...do..	4,000.00	2,010.00	...do..	.....do.....	Do.
.....	.....	...do..	4,000.00	1,460.00	Good .	.....do.....	Do.
1889	Jeffersonville, Ind.	Steel..	5,110.00	2,010.00	...do..	.....do.....	Do.
.....	.....	Wood.	4,034.00	2,200.00	Fair ..	.....do.....	Do.
.....	.....	Steel..	3,538.00	1,920.00	Good .	.....do.....	Do.
1903	La Crosse, Wis..	Wood.	1,500.00	850.00	Fair ..	.....do.....	Do.
1908	Redwing, Minn.	...do..	1,975.00	1,290.00	Good .	.....do.....	Do.
1909	Newport, Ky...	...do..	435.00	350.00	...do..	.....do.....	Improving Mississippi River from Missouri River to Minneapolis, Minn.
1904	St. Joseph, Mich.	...do..	1,000.00	490.00	...do..	.....do.....	Operating and care Des Moines Rapids Canal.
.....	.....	...do..	350.00	225.00	...do..	.....do.....	Do.
.....	.....	...do..	171.00	140.00	...do..	.....do.....	Improving Mississippi River from mouth of Ohio River to Minneapolis, Minn.; between mouth of Missouri River and Minneapolis.
.....	.....	...do..	240.00	195.00	...do..	.....do.....	Do.
.....	.....	...do..	244.00	195.00	...do..	.....do.....	Do.
.....	.....	...do..	241.00	195.00	...do..	.....do.....	Do.
.....	.....	...do..	301.00	240.00	...do..	.....do.....	Do.
.....	.....	...do..	245.00	195.00	...do..	.....do.....	Do.
.....	.....	...do..	262.00	210.00	...do..	.....do.....	Do.
.....	.....	...do..	262.00	250.00	...do..	.....do.....	Do.
.....	.....	...do..	262.00	125.00	...do..	.....do.....	Do.
.....	.....	...do..	262.00	125.00	...do..	.....do.....	Do.
.....	.....	...do..	200.00	145.00	...do..	.....do.....	Do.
.....	.....	...do..	200.00	135.00	...do..	.....do.....	Do.
.....	.....	...do..	200.00	130.00	...do..	.....do.....	Do.
.....	.....	...do...	498.00	400.00	...do...	.....do.....	Improving Mississippi River from mouth of Ohio River to Minneapolis, Minn.; between mouth of Missouri River and Minneapolis.
.....	.....	...do...	365.00	300.00	...do...	.....do	Do.
.....	.....	...do...	285.00	230.00	...do...	.....do	Do.
.....	.....	...do...	321.00	260.00	...do...	.....do	Do.
1876	Keokuk, Iowa...	...do...	11,300.00	5,625.00	Fair...	.....do.....	Operating and care Des Moines Rapids Canal.
1883	Davenport, Iowa	...do...	19,450.00	8,640.00	...do...	.....do.....	Improving Mississippi River from mouth of Ohio River to Minneapolis, Minn.; between mouth of Missouri River and Minneapolis.
1885	Metropolis, Ill...	...do...	19,524.00	16,425.00	Good..	.....do.....	Do.
.....	.....	...do...	27,380.00	12,240.00	...do...	.....do.....	Do.
.....	.....	...do...	5,450.00	9,370.00	...do...	.....do.....	Do.

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TABLE V.—*Statement of floating plant owned by the United States and*

ROCK ISLAND, ILL.—Continued.

Name or number.	Class and description.	Tonnage.	Dimensions.			Built.	
			Length.	Width.	Depth.	When.	Where.
			Ft. in.	*Ft. in.*	*Ft. in.*		
Pelee (No. 235 and 13 pontons).	Suction dredge		119 0	30 0	5 0	1909	Stillwater, Minn.
Vesuvius (No. 260 and 13 pontons).	....do		120 0	30 0	5 0	1909	Fountain City, Wis.
Etna (No. 300 and 11 pontons).	....do		130 0	28 0	5 0	1909	Keokuk, Iowa.
No. 319	Derrick dredge		70 0	26 0	4 0	1909	Milan, Ill.
No. 34	Steam drill boat		66 0	18 0	4 0	1881	Davenport, Iowa.
No. 6	....do		80 0	20 0	4 0	1893	Keokuk, Iowa.
No. 103	....do		81 0	18 0	4 0	1889	....do.
No. 33	Pile driver		66 0	18 0	4 0	1893	....do.
No. 104	....do		65 0	18 0	3 0	1889	....do.
Nos. 13, 14, 15, and 16.	Dump boats		73 0	18 0	5 6	1909 1910	Milan, Ill.
A. C. D	....do		73 0	18 0	5 0	1903 1904	Keokuk, Iowa.
No. 236	Building boat		120 0	20 0	4 0	1904	Fountain City, Wis.
No. 208	....do		160 0	26 0	4 0	1904	Keokuk, Iowa.
No. 209	....do		140 0	22 0	4 0	1903	St. Paul, Minn.
No. 333	....do		160 0	26 0	4 6	1909	S. Stillwater, Minn.
No. 338	....do		120 0	20 0	4 0	1909	Fountain City, Wis.
No. 224	Grasshopper		40 0	36 0	3 6	1904	Grafton, Ill.
Nos. 336 and 337	....do		36 0	16 0	2 0	1909	Fountain City, Wis.
No. 339	....do		40 0	30 0	3 0	1909	Dubuque, Iowa.
Nos. 30 and 106	Magazine boats		20 0	7 0	2 0	1889 1893	Keokuk, Iowa.
Nos. 28 and 107	Loading boats		20 0	6 0	2 0	1889 1893	....do.
No. 205	Sounding boat		50 0	18 0	3 0	1902	....do.
No. 230	Store boat		80 0	20 0	4 0	1904	Fountain City, Wis.
Nos. 234 and 334	Store boats		80 0	18 0	3 0	1908	Stillwater, Minn., Dubuque, Iowa.
No. 335	Store boat		100 0	20 0	3 6	1909	Fountain City, Wis.
No. 20	Office boat		64 0	18 0	3 0	1897	....do.
Nos. 119 and 120	Office boats		40 0	14 0	2 0	1892 1909	La Crosse, Wis., Keokuk, Iowa.
Nos. 48 and 51	....do		40 0	12 0	2 0	1894	Keokuk, Iowa.
Nos. 12 and 41	....do		32 0	14 0	3 2	1895	....do.
Nos. 66, 68, 81, 85, 86, and 90.	....do		32 0	12 0	2 0	1893	....do.
No. 67	Office boat		66 0	18 0	3 6	1893	La Crosse, Wis.
No. 204	....do		60 0	18 0	4 0	1902	Fountain City, Wis.
No. 69	....do		50 0	16 0	3 0	1893	La Crosse, Wis.
Nos. 11, 47, and 71	Quarter boats		75 0	20 0	3 0	1894	Keokuk, Iowa.
No. 75	Quarter boat		75 0	20 0	3 6	1882	Davenport, Iowa.
Nos. 118 and 202	Quarter boats		70 0	20 0	3 0	1891 1895	Keokuk, Iowa, Fountain City, Wis.
No. 301	Quarter boat		75 0	20 0	4 0	1909	Keokuk, Iowa.
No. 17	....do		70 0	24 0	3 0	1893	Stillwater, Minn.
No. 262	....do		66 0	22 0	3 0	1909	Fountain City, Wis.
No. 183	....do		100 0	20 0	3 0	1895	Keokuk, Iowa.
No. 52	....do		58 0	18 0	3 6	1895	Fountain City, Wis.
No. 94	....do		65 0	18 0	3 0	(a)	(a)
No. 184	....do		60 0	18 0	3 0	1894	Quincy, Ill.
Nos. 121, 122, 123, and 124.	Quarter boats		52 0	16 0	2 6	1892	Rock Island, Ill.

a Not known.

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employed in the Engineer Department at Large on June 30, 1910—Continued.

ROCK ISLAND, ILL.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
When.	Where.						
.....	.....	Wood.	$33,600.00	$26,880.00	Good .	Upper Mississippi River and tributaries, between mouth of Missouri River and Minneapolis, Minn.	Improving Mississippi River from mouth of Ohio River to Minneapolis, Minn.; between mouth of Missouri River and Minneapolis.
.....	.....	...do...	33,375 00	27,070.00	...do...	.....do.....	Do.
.....	.....	...do...	29,415.00	23,650.00	...do...	.....do.....	Do.
.....	.....	...do...	2,567.00	2,330.00	...do...	.....do.....	Do.
1881	Davenport, Iowa	...do...	1,200.00	450.00	Fair...	.....do.....	Do.
.....	.....	...do...	3,420.00	3,870.00	...do...	.....do.....	Do.
.....	.....	...do...	2,216.00	2,830.00	Bad...	.....do.....	Do.
.....	.....	...do...	1,400.00	2,210.00	Good..	.....do.....	Do.
.....	.....	...do...	2,634.00	785.00	Fair...	.....do.....	Do.
.....	.....	...do...	8,407.00	7,570.00	Good..	.....do.....	Do.
.....	.....	...do...	4,500.00	2,820.00	Fair...	.....do.....	Operating and care Des Moines Rapids Canal.
.....	.....	...do...	1,500.00	800.00	Good..	.....do.....	Improving Mississippi River from mouth of Ohio River to Minneapolis, Minn.; between mouth of Missouri River and Minneapolis
.....	.....	...do...	4,390.00	2,765.00	...do...	.....do.....	Do.
.....	.....	...do...	2,140.00	1,265.00	...do...	.....do.....	Do.
.....	.....	...do...	4,010.00	3,210.00	...do...	.....do.....	Do.
.....	.....	...do...	1,663.00	1,330.00	...do...	.....do.....	Do.
.....	.....	...do...	402.00	200.00	...do...	.....do.....	Do.
.....	.....	...do...	890.00	700.00	...do...	.....do.....	Do.
.....	.....	...do...	580.00	465.00	...do...	.....do.....	Do.
.....	.....	...do...	250.00	150.00	1 good, 1 fair.	.....do.....	Do.
.....	.....	...do...	250.00	190.00	Good..	.....do.....	Do.
.....	.....	...do...	580.00	135.00	...do...	.....do.....	Do.
.....	.....	...do...	700.00	305.00	...do...	.....do.....	Do.
.....	.....	...do...	2,759.00	1,795.00	Good..	.....do.....	Do.
.....	.....	...do...	2,189.00	1,750.00	...do...	.....do.....	Do.
.....	.....	...do...	1,451.00	560.00	...do...	.....do.....	Do.
1892	La Crosse, Wis.	...do ..	753.00	1,265.00	...do...	.....do	Do.
.....	.....	...do ..	568.00	590.00	...do...	.....do	Do
.....	.....	...do ..	427.00	225.00	...do...	.....do	Do.
.....	.....	...do ..	1,206.00	775.00	3 fair, 3 bad.	.....do	Do.
.....	.....	...do ..	1,727.00	1,725.00	Fair...	.....do	Do
.....	.....	...do ..	1,420.00	1,075.00	Good..	.....do	Do
.....	.....	...do ..	606.00	210.00	Fair...	.....do	Do.
.....	.....	...do ..	4,347.00	3,120.00	1 good, 2 fair.	.....do	Do.
1882	Davenport, Iowa	...do ..	700.00	1,665.00	Fair...	.....do	Do
.....	.....	...do ..	2,672.00	1,765.00	1 fair, 1 bad.	....do	Do.
.....	.....	...do ..	3,027.00	2,420.00	Good..	.....do	Do
.....	.....	...do ..	1,138.00	1,955.00	...do...	.....do	Do
.....	.....	...do ..	2,490.00	1,995.00	...do...	.....do	Do.
.....	.....	...do ..	2,320.00	1,700.00	Fair...	.....do	Do.
.....	.....	...do ..	974.00	935.00	...do...	.....do	Do.
1884	St. Paul, Minn.	...do ..	250.00	520.00	...do...	.....do	Do.
.....	.....	...do...	870.00	560.00	...do...	.....do	Do.
1892	Rock Island, Ill.	...do...	1,720.00	1,610.00	1 good, 3 fair.	.....do	Do.

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TABLE V.—*Statement of floating plant owned by the United States and*

ROCK ISLAND, ILL.—Continued.

Name or number.	Class and description.	Tonnage.	Dimensions.			Built.	
			Length.	Width.	Depth.	When.	Where.
			Ft. in.	*Ft. in.*	*Ft. in.*		
No. 91	Quarter boat		50 0	12 0	3 0	1884	Davenport, Iowa.
No. 65	do		40 0	16 0	2 0	1893	La Crosse, Wis.
No. 45	do		74 0	16 0	3 0	1894	Keokuk, Iowa.
Sangamon (No. 231)	do		100 0	20 0	4 3	1904	Kampsville, Ill.
La Salle (No. 232)	do		100 0	20 0	4 3	1904	do.
Nos. 53 and 54	Barges		104 0	24 0	5 0	1893	Keokuk, Iowa.
No. 302	Barge		110 0	24 0	5 0	1909	do.
No. 96	do		120 0	20 0	5 0	1885	Le Claire, Iowa.
Nos. 4, 7, 70, 153, 161, 179, 181, 214, 215, 216, 217, 218, and 219.	Barges		110 0	24 0	4 6	1893 1894 1895 1904	Quincy, Ill. Keokuk, Iowa, St. Paul, Minn.
No. 5	Barge		50 0	12 0	3 0	1892	Stillwater, Minn.
H	do		50 0	10 0	2 0	1886	Keokuk, Iowa.
K	do		50 0	14 0	3 0	1891	do.
L	do		110 0	24 0	5 0	1905	do.
G	do		40 0	10 0	2 0	1882	do.
No. 82	do		76 0	18 0	4 0	1901	do.
Nos. 238, 239, 263, and 264.	Barges		67 0	16 0	4 4	1909	Fountain City, Wis., Stillwater, Minn.
No. 147	Barge		85 0	20 0	4 0	1903	Milan, Ill.
No. 233	do		52 0	15 6	3 6	(a)	(a)
Nos. 130, 131, 132, 133, 134, 152, 163, 169, 170, 172, 173, 186, 187, 188, 192, 193, 194, 206, 207, 210, 211, 212, 213, 220, 221, 222, 226, 227, 228, and 229.	Barges		100 0	20 0	4 0	1889 to 1904	Fountain City, Wis., Rock Island, Ill., Keokuk, Iowa, St. Paul, Minn., Milan, Ill., Davenport, Iowa, Stillwater, Minn.
Nos. 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, and 259.	do		110 0	24 0	5 0	.....	S. Stillwater, Minn.
Nos. 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 320, 321, 322, 323, 324, 325, 326, 327, 328 and 329.	do		100 0	20 0	4 6	1909	Fountain City, Wis.; Milan, Ill.; Keokuk, Iowa.
Nos. 330 and 331	do		66 0	16 0	4 6	1909	S. Stillwater, Minn.

(a) Not known.

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employed in the Engineer Department at Large on June 30, 1910—Continued.

ROCK ISLAND, ILL.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
When.	Where.						
1882	Davenport, Iowa.	Wood.	$452.00	$380.00	Fair...	Upper Mississippi River and tributaries, between mouth of Missouri River and Minneapolis, Minn.	Improving Mississippi River from mouth of Ohio River to Minneapolis, Minn.; between mouth of Missouri River and Minneapolis.
.....	.....	...do...	415.00	375.00	Good..	.....do.....	Do.
.....	.....	...do...	657.00	365.00	Fair...	.....do.....	Do.
.....	.....	...do...	2,970.00	1,865.00	...do...	.....do.....	Do.
.....	.....	...do...	2,365.00	840.00	...do...	.....do.....	Do.
.....	.....	...do...	2,702.00	895.00	...do...	.....do.....	Do.
.....	.....	...do...	1,768.00	1,415.00	Good..	.....do.....	Do.
1885	Le Claire, Iowa.	...do...	1,300.00	390.00	Bad...	.....do.....	Do.
.....	.....	...do...	18,525.00	11,505.00	4 good, 7 fair, 2 bad.	....do.....	Do.
1892	Stillwater, Minn.	...do...	275.00	135.00	Fair...	.....do.....	Do.
.....	.....	...do...	231.00	25.00	Bad...	.....do.....	Operating and care Des Moines Rapids Canal.
.....	.....	...do...	397.00	210.00	Fair...	.....do.....	Do.
.....	.....	...do...	1,258.00	640.00	Good..	.....do.....	Do.
.....	.....	...do...	250.00	160.00	...do...	.....do.....	Do.
.....	.....	...do...	132.00	95.00	...do...	.....do.....	Improving Mississippi River from mouth of Ohio River to Minneapolis, Minn., between mouth of Missouri River and Minneapolis.
.....	.....	...do..	2,880.00	2,855.00	...do..	.....do.....	Do.
.....	.....	...do...	340.00	495.00	Fair...	.....do.....	Do.
1907	Rock Island, Ill.	...do...	195.00	115.00	...do...	.....do.....	Do.
1889 to 1904	Davenport, Iowa, Stillwater, Minn., St. Paul, Minn.	..do..	24,394.00	8,890.00	10 good, 16 fair, 4 bad.	....do.....	Do.
.....	.....	...do...	33,597.00	26,875.00	Good..	.....do.....	Do.
.....	.....	...do...	68,292.00	54,635.00	Good..	.....do.....	Do.
.....	.....	...do...	1,434.00	1,145.00	...do...	.....do.....	Do.

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TABLE V.—*Statement of floating plant owned by the United States and*

SAN FRANCISCO, CAL., FIRST DISTRICT.

Name or number.	Class and description.	Tonnage.	Dimensions.			Built.	
			Length.	Width.	Depth.	When.	Where.
			Ft. in.	Ft. in.	Ft. in.		
Gen. Alexander	Steamer (towboat)	110.00	77 6	18 0	8 0	1901	San Francisco.

SAN FRANCISCO, CAL., SECOND DISTRICT.

Seizer	Stern-wheel snag boat	150.00	136 6	34 0	4 8	1881	Stockton, Cal.
Tackle	Snag scow	30.00	64 0	28 0	3 6	1908	Oakland, Cal.

SAVANNAH, GA.

Cumberland	Seagoing suction dredge.	1,451.00	200 0	40 8	20 0	1902	Belfast, Me.
Savannah	do	1,236.00	177 0	38 0	19 6	1904	Sparrow Point, Md.
Morgan	Self-propelling suction dredge.	667.00	137 0	38 4	8 5	1908	Baltimore, Md.
Tugaloo	Stern-wheel snag boat	253.00	129 0	34 0	5 6	1902	Savannah, Ga.
Angler	Steam launch	112.00	85 6	16 0	10 6	1905	Charleston, S. C.
Gem	do	4.00	40 0	8 0	3 0	1891	New York, N. Y.
Radius	Naphtha launch	1.00	18 0	5 0	1 6	(a)	
Oconee	Stern-wheel snag boat	115.00	110 0	24 0	4 0	(b)	
Sapelo	Combined hoister and pile driver, not self-propelling.	100.00	83 0	30 0	5 0	1894	Savannah, Ga.
Skidaway	Self-propelling quarter boat.	18.00	51 6	12 0	4 0	1907	Brunswick, Ga.
Spray	Naphtha launch	10.00	45 0	11 0	4 0	1907	New York, N. Y.
Amelia	do	6.00	35 0	8 0	4 0	1901	Long Island, N. Y.
Cosine	do	3.00	26 0	7 2	2 6	(c)	
Pile driver	With engine and boiler		45 0	17 0	3 0	1908	Macon, Ga.

a Unknown.

b Unknown. New hull built in 1908.

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employed by the Engineer Department at Large on June 30, 1910—Continued.

SAN FRANCISCO, CAL., FIRST DISTRICT.

Purchased. When.	Purchased. Where.	Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
1901	San Francisco...	Wood.	$20.000.00	$15,000.00	Fair...	Transferred in June, 1907, to Quartermaster's Department for temporary use of Artillery Corps in connection with torpedo instruction and practice, under authority of Secretary of War, Oct. 25, 1906 (E. D. 56191/4). Authority of Secretary of War for continuation in service of Quartermaster's Department, Dec. 14, 1909 (E. D. 56191/15).	Fortifications, San Francisco Harbor, Cal.

SAN FRANCISCO, CAL., SECOND DISTRICT.

.....	.....	Wood.	$35,000.00	$20,000.00	Fair...	Sacramento and Feather rivers, Cal.	Improving Sacramento and Feather rivers, Cal. "General improvement."
.....	.....	...do...	6,525.62	5,500.00	Good..	.....do.....	Do.

SAVANNAH, GA.

1902	Belfast, Me.....	Wood.	$150,000.00	$125,000.00	Good .	Savannah Harbor, Ga.	Savannah, Ga., district.
1904	Sparrows Point, Md.	Steel..	200,000.00	200,000.00	...do...	.....do.....	Do.
1908	Baltimore, Md..	...do...	119,756.00	119,756.00	...do...	.....do.....	Do.
1902	Savannah, Ga...	Wood.	25,000.00	25,000.00	...do...	Savannah River, Ga.	Do.
1905	Charleston, S. C.	...do...	12,000.00	15,000.00	...do...	Savannah Harbor, Ga.	Do.
1902	New York, N.Y.	...do...	1,500.00	1,500.00	Fair...	.....do.....	Do.
1903	Baltimore, Md..	...do...	325.00	175.00	...do...	.....do.....	Do.
1901	Brunswick, Ga..	...do...	3,750.00	6,000.00	...do...	Altamaha, Oconee, and Ocmulgee rivers, Ga.	Do.
1894	Savannah, Ga...	...do...	1,800.00	5,000.00	...do...	.....do.....	Do.
1907	Brunswick, Ga..	...do...	3,500.00	2,500.00	...do...	.....do.....	Do.
1909	New York, N.Y.	...do...	4,800.00	4,800.00	Good .	Brunswick Harbor, Ga.	Do.
1904	Long Island, N. Y.	...do...	2,500.00	1,000.00	Fair...	.....do.....	Do.
1903	Macon, Ga.....	...do...	350.00	350.00	...do...	.....do.....	Do.
.....	.....	.....	2,000.00	2,000.00	Good .	Altamaha, Oconee, and Ocmulgee rivers, Ga.	Do.

[c] Unknown. New hull built in 1907.

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TABLE V.—*Statement of floating plant owned by the United States and*

SEATTLE, WASH.

Name or number.	Class and description.	Tonnage.	Dimensions.			Built.	
			Length.	Width.	Depth.	When.	Where.
			Ft. in.	Ft. in.	Ft. in.		
Wilson	Steel-hull tug	106.00	94 0	19 6	11 0	1899	Detroit, Mich.
Skagit	Steam snag boat	175.00	114 1	31 0	4 10	[a]1896	Ballard, Wash.
Oregon	Suction dredge		120 0	36 0	11 0	1908	Portland, Oreg.
Vigilant	Gasoline launch	22.00	63 11	11 6	4 0	1908	Eagle Harbor, Wash.
No. 1	Scow		100 0	32 0	8 9	1899	Seattle, Wash.
No. 2	do		100 0	32 0	8 9	1899	do
A (no name)	do		80 0	26 0	8 0	[b]	
B (no name)	do		70 0	22 0	5 0	1908	Aberdeen, Wash.
No name	do		100 0	24 0	4 0	1907	Okanogan River.
C (no name)	do		60 0	19 0	4 0	1909	Aberdeen, Wash.

ST. LOUIS, MO.

J. N. Macomb	Snag boat	733.00	177 6	62 0	8 0	1874	Covington, Ky.
H. G. Wright	do	783.00	187 0	62 0	8 0	1880	St. Louis, Mo.
Gen. J. H. Simpson	Towboat	280.00	170 0	32 0	5 0	1895	Jeffersonville, Ind.
Wm. R. King	do	400.00	190 0	41 0	5 0	1899	do
No. 3	Hydraulic dredge	372.00	160 0	40 0	6 0	1898	do
No. 4	do	372.00	160 0	40 0	6 0	1898	do
No. 5	Hydraulic dredge, self-propelling.	900.00	197 0	45 0	7 6	1908	Dubuque, Iowa
No. 6	do	900.00	197 0	45 0	7 6	1908	do
No. 3	Steam tender	37.00	81 0	18 0	3 3	1893	Jeffersonville, Ind.
No. 4	do	37.00	81 0	18 0	3 3	1893	do
No. 5	do	37.00	81 0	18 0	3 3	1894	do
No. 6	do	16.00	55 0	13 0	3 2	1894	do
No. 7	do	16.00	55 0	13 0	3 2	1894	do
No. 8	do	100.00	100 0	24 0	4 3	1900	do
No. 9	do	100.00	100 0	24 0	4 3	1900	do
No. 10	do	100.00	100 0	24 0	4 3	1900	do
No. 101	Model barge	156.00	135 0	28 0	5 0	1891	Cincinnati, Ohio
No. 102	do	156.00	135 0	28 0	5 0	1891	do
No. 103	do	156.00	135 0	28 0	5 0	1891	do
No. 104	do	156.00	135 0	28 0	5 0	1891	do
No. 110	do	156.00	135 0	28 0	5 0	1891	do
No. 114	do	156.00	135 0	28 0	5 0	1893	Paducah, Ky.
No. 115	do	156.00	135 0	28 0	5 0	1893	do

[a] Rebuilt.

[b] Unknown.

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employed in the Engineer Department at Large on June 30, 1910—Continued.

SEATTLE, WASH.

Purchased. When.	Purchased. Where.	Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
.....	.....	Steel..	$37,000.00	$27,000.00	Good .	Puget Sound.....	River and harbor and fortification works.
.....	.....	Wood..	12,000.00	8,000.00	Poor..	Rivers of Puget Sound.	Improving Puget Sound, Wash.
.....	.....	...do...	81,274.00	80,000.00	Good .	Grays Harbor, Wash.	River and harbor works in Portland, Oreg., second district, and Seattle, western district.
.....	.....	...do...	9,500.00	9,500.00	...do...	Puget Sound.....	River and harbor works.
.....	.....	...do...	2,970.00	1,800.00	Fair...	Puget Sound fortifications and river and harbor works.	Gun and mortar batteries.
.....	.....	...do...	2,970.00	1,800.00	...do...	.....do.....	Do.
.....	.....	...do...	750.00	750.00	...do...	Grays Harbor, Wash.	Improving Grays Harbor.
.....	Aberdeen, Wash.	...do...	1,100.00	900.00	...do...	.....do.....	Do.
.....	.....	...do...	900.00	700.00	...do...	Columbia River...	Improving Columbia River between Wenatchee and Bridgeport, Wash.
.....	.....	...do...	690.00	400.00	...do...	Grays Harbor, Wash.	Improving Grays Harbor and Chehalis River, Wash.

ST. LOUIS, MO.

.....	.....	Steel..	$24,1000.00	$76,000.00	Good..	Mississippi, Atchafalaya and Old rivers.	Removing obstructions in Mississippi, Atchafalaya, and Old rivers.
.....	.....	...do...	190,000.00	78,200.00	...do...	.....do.....	Do.
.....	.....	Wood.	40,000.00	11,071.31	Poor..	Mississippi River..	Improving Mississippi River from mouth of Ohio River to Minneapolis, Minn., and between mouths of Ohio and Missouri rivers.
.....	.....	Steel..	72,000.00	46,825.43	Good..	.....do.....	Do.
.....	.....	...do...	117,151.06	78,230.50	...do...	.....do.....	Do.
.....	.....	...do...	114,574.95	71,884.19	...do...	.....do.....	Do.
.....	.....	...do...	177,978.98	168,015.50	...do...	.....do.....	Do.
.....	.....	...do...	176,795.56	167,315.98	...do...	.....do.....	Do.
.....	.....	Wood.	5,030.00	2,834.74	...do...	.....do.....	Do.
.....	.....	...do...	5,030.00	2,834.74	...do...	.....do.....	Do.
.....	.....	...do...	6,990.00	2,834.74	...do...	.....do.....	Do.
.....	.....	...do...	4,400.00	1,300.00	...do...	.....do.....	Do.
.....	.....	...do...	4,400.00	1,300.00	...do...	.....do.....	Do.
.....	.....	Steel..	19,279.50	10,358.43	...do...	.....do.....	Do.
.....	.....	...do...	19,279.50	10,358.43	...do...	.....do.....	Do.
.....	.....	...do...	19,279.50	15,907.40	...do...	.....do.....	Do.
.....	.....	Wood.	3,750.00	350.00	Very poor.	.....do.....	Do.
.....	.....	...do...	3,750.00	.....	(c)	.....do.....	Do.
.....	.....	...do...	3,750.00	350.00	Very poor.	.....do.....	Do.
.....	.....	...do...	3,750.00	350.00	...do...	.....do.....	Do.
.....	.....	...do...	3,795.00	450.00	...do...	.....do.....	Do.
.....	.....	...do...	3,700.00	1,300.00	Poor..	.....do.....	Do.
.....	.....	...do...	3,700.00	1,300.00	...do...	.....do.....	Do.

c Condemned; no sale.

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TABLE V.—*Statement of floating plant owned by the United States and*

ST. LOUIS, MO.—Continued.

Name or number.	Class and description.	Tonnage.	Dimensions.			Built.	
			Length.	Width.	Depth.	When.	Where.
			Ft. in.	Ft. in.	Ft. in.		
No. 116	Model barge (store boat)	156.00	136 0	28 0	5 0	1893	Paducah, Ky
No. 117	do	156.00	135 0	28 0	5 0	1893	do
No. 118	do	156.00	135 0	28 0	5 0	1893	do
No. 119	do	156.00	135 0	28 0	5 0	1893	do
No. 120	do	156.00	135 0	28 0	5 0	1894	Cincinnati, Ohio
No. 121	do	156.00	135 0	28 0	5 0	1894	do
No. 122	do	156.00	135 0	28 0	5 0	1894	do
No. 123	do	156.00	135 0	28 0	5 0	1894	do
No. 124	do	156.00	135 0	28 0	5 0	1894	do
No. 125	do	156.00	135 0	28 0	5 0	1894	do
No. 126	do	156.00	135 0	28 0	5 0	1894	do
No. 127	do	156.00	135 0	28 0	5 0	1894	Madison, Ind
No. 128	do	156.00	135 0	28 0	5 0	1894	do
No. 129	do	156.00	135 0	28 0	5 0	1894	do
No. 130	do	156.00	135 0	28 0	5 0	1894	do
No. 131	do	156.00	135 0	28 0	5 0	1894	do
No. 132	do	156.00	135 0	28 0	5 0	1894	do
No. 133	do	156.00	135 0	28 0	5 0	1894	Jeffersonville, Ind.
No. 134	do	156.00	135 0	28 0	5 0	1894	do
No. 135	do	156.00	135 0	28 0	5 0	1894	do
No. 136	do	156.00	135 0	28 0	5 0	1894	do
No. 137	do	156.00	135 0	28 0	5 0	1894	do
No. 138	do	156.00	135 0	28 0	5 0	1894	do
No. 142	do	156.00	135 0	28 0	5 0	1895	Madison, Ind
No. 143	do	156.00	135 0	28 0	5 0	1895	do
No. 201	do	156.00	135 0	28 0	5 0	1893	do
No. 202	do	156.00	135 0	28 0	5 0	1898	do
No. 204	do	156.00	135 0	28 0	5 0	1898	do
No. 205	do	156.00	135 0	28 0	5 0	1898	do
No. 206	do	156.00	135 0	28 0	5 0	1898	do
No. 207	do	156.00	135 0	28 0	5 0	1898	do
No. 208	do	156.00	135 0	28 0	5 0	1898	do
No. 209	do	156.00	135 0	28 0	5 0	1898	do
No. 210	do	156.00	135 0	28 0	5 0	1898	do
No. 211	do	156.00	135 0	28 0	5 0	1898	do
No. 212	do	156.00	135 0	28 0	5 0	1898	do
No. 213	do	156.00	135 0	28 0	5 0	1898	Cincinnati, Ohio
No. 214	do	156.00	135 0	28 0	5 0	1898	do
No. 215	do	156.00	135 0	28 0	5 0	1898	do
No. 216	do	156.00	135 0	28 0	5 0	1898	do
No. 217	do	156.00	135 0	28 0	5 0	1898	do
No. 218	do	156.00	135 0	28 0	5 0	1898	do
No. 4	Flat barge	100.00	100 0	25 0	5 4	1893	Gasconade, Mo.
No. 1	Quarter boat	148.00	135 0	30 0	3 11	1893	Cincinnati, Ohio
No. 2	do	148.00	135 0	30 0	3 11	1893	do
No. 3	do	148.00	135 0	30 0	3 11	1893	do
No. 4	do	148.00	135 0	30 0	3 11	1893	do
No. 5	do	148.00	135 0	30 0	3 11	1893	do
No. 6	do	148.00	135 0	30 0	3 11	1893	do
No. 7	do	148.00	135 0	30 0	3 11	1893	Jeffersonville, Ind.
No. 8	do	148.00	135 0	30 0	3 11	1893	do
No. 9	do	148.00	135 0	30 0	3 11	1893	do
No. 10	do	148.00	135 0	30 0	3 11	1893	do
No. 1	Office and survey boat	122.00	135 0	26 0	3 6	1893	Dubuque, Iowa
No. 2	do	122.00	135 0	26 0	3 6	1893	do
No. 3	do	122.00	135 0	26 0	3 6	1893	do
No. 4	do	122.00	135 0	26 0	3 6	1893	Jeffersonville, Ind.
No. 5	do	130.00	115 0	25 0	5 0	1893	Gasconade, Mo.
No. 1	Pile driver	41.00	68 0	20 0	3 6	1894	Cincinnati, Ohio
No. 3	do	41.00	68 0	20 0	3 6	1894	do
No. 4	do	41.00	68 0	20 0	3 6	1894	do
No. 5	do	41.00	68 0	20 0	3 6	1894	do
No. 12	do	41.00	68 0	20 0	3 6	1894	do
No. 14	do	41.00	68 0	20 0	3 6	1894	do

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employed in the Engineer Department at Large on June 30, 1910—Continued.

ST LOUIS, MO —Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
When.	Where.						
.....	.....	Wood.	$3,700.00	$2,500.00	Good..	Mississippi River.	Improving Mississippi River from mouth of Ohio River to Minneapolis, Minn., and between mouths of Ohio and Missouri rivers.
.....	.....	...do...	3,700.00	1,300.00	Poor..	.....do.....	Do.
.....	.....	...do...	3,700.00	1,300.00	...do...	.....do.....	Do.
.....	.....	...do...	3,700.00	1,300.00	...do...	.....do.....	Do.
.....	.....	...do...	3,847.00	1,300.00	...do...	.....do.....	Do.
.....	.....	...do...	3,847.00	1,300.00	...do...	.....do.....	Do.
.....	.....	...do...	3,847.00	1,300.00	...do...	.....do.....	Do.
.....	.....	...do...	3,722.00	1,300.00	...do...	.....do.....	Do.
.....	.....	...do...	3,847.00	1,300.00	...do...	.....do.....	Do.
.....	.....	...do...	3,847.00	1,300.00	...do...	.....do.....	Do.
.....	.....	...do...	2,885.00	1,300.00	...do...	.....do.....	Do.
.....	.....	...do...	3,590.00	2,000.00	Good ..	.....do.....	Do.
.....	.....	...do...	3,590.00	2,000.00	...do...	.....do.....	Do.
.....	.....	...do...	3,590.00	2,000.00	...do...	.....do.....	Do.
.....	.....	...do...	3,590.00	2,000.00	...do...	.....do.....	Do.
.....	.....	...do...	3,590.00	2,000.00	...do...	.....do.....	Do.
.....	.....	...do...	3,590.00	2,010.00	...do...	.....do.....	Do.
.....	.....	...do...	3,650.00	2,000.00	...do...	.....do.....	Do.
.....	.....	...do...	3,650.00	2,000.00	...do...	.....do.....	Do.
.....	.....	...do...	3,650.00	2,000.00	...do...	.....do.....	Do.
.....	.....	...do...	3,650.00	100.00	Very poor.	.....do.....	Do.
.....	.....	...do...	3,650.00	2,000.00	Good ..	.....do.....	Do.
.....	.....	...do...	3,650.00	100.00	Very poor.	.....do.....	Do.
.....	.....	...do...	3,385.00	.....	(a)	.....do.....	Do.
.....	.....	...do...	3,385.00	.....	(a)	.....do.....	Do.
.....	.....	...do...	3,800.00	800.00	Poor..	.....do.....	Do.
.....	.....	...do...	3,800.00	800.00	...do...	.....do.....	Do.
.....	.....	...do...	3,800.00	800.00	...do...	.....do.....	Do.
.....	.....	...do...	3,800.00	800.00	...do...	.....do.....	Do.
.....	.....	...do...	3,800.00	1,048.65	...do...	.....do.....	Do.
.....	.....	...do...	3,800.00	800.00	...do...	.....do.....	Do.
.....	.....	...do...	3,800.00	800.00	...do...	.....do.....	Do.
.....	.....	...do...	3,800.00	1,100.00	...do...	.....do.....	Do.
.....	.....	...do...	3,800.00	1,100.00	...do...	.....do.....	Do.
.....	.....	...do...	3,800.00	1,100.00	...do...	.....do.....	Do.
.....	.....	...do...	3,800.00	1,100.00	...do...	.....do.....	Do.
.....	.....	...do...	3,597.00	1,100.00	...do...	.....do.....	Do.
.....	.....	...do...	3,597.00	1,100.00	...do...	.....do.....	Do.
.....	.....	...do...	3,597.00	1,100.00	...do...	.....do.....	Do.
.....	.....	...do...	3,597.00	1,100.00	...do...	.....do.....	Do.
.....	.....	...do...	3,597.00	1,100.00	...do...	.....do.....	Do.
.....	.....	...do...	3,597.00	1,100.00	...do...	.....do.....	Do.
1903	Gasconade, Mo.	...do...	200.00	1,774.85	Good ..	.....do.....	Do.
.....	.....	...do...	5,200.00	1,000.00	Poor..	.....do.....	Do.
.....	.....	...do...	5,200.00	1,420.00	...do...	.....do.....	Do.
.....	.....	...do...	5,200.00	1,210.00	...do...	.....do.....	Do.
.....	.....	...do...	5,200.00	4,105.86	Good ..	.....do.....	Do.
.....	.....	...do...	5,200.00	1,000.00	Poor..	.....do.....	Do.
.....	.....	...do...	5,200.00	4,000.00	Good ..	.....do.....	Do.
.....	.....	...do...	5,390.00	2,100.00	Fair...	.....do.....	Do.
.....	.....	...do...	5,390.00	3,800.00	Good ..	.....do.....	Do.
.....	.....	...do...	5,390.00	1,000.00	Poor..	.....do.....	Do.
.....	.....	...do...	5,390.00	1,000.00	...do...	.....do.....	Do.
.....	.....	...do...	4,400.00	1,500.00	Fair...	.....do.....	Do.
.....	.....	...do...	4,400.00	832.16	Poor..	.....do.....	Do.
.....	.....	...do...	4,400.00	1,500.00	Fair...	.....do.....	Do.
.....	.....	...do...	4,340.00	1,500.00	...do...	.....do.....	Do.
1903	Gasconade, Mo.	...do...	2,000.00	4,000.00	Good a	.....do.....	Do.
.....	.....	...do...	4,500.00	850.00	Poor..	.....do.....	Do.
.....	.....	...do...	4,500.00	850.00	...do...	.....do.....	Do.
.....	.....	...do...	4,500.00	700.00	...do...	.....do.....	Do.
.....	.....	...do...	4,500.00	850.00	...do...	.....do.....	Do.
.....	.....	...do...	4,500.00	700.00	...do...	.....do.....	Do.
.....	.....	...do...	4,500.00	467.51	...do...	.....do.....	Do.

a Condemned; no sale.

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TABLE V.—*Statement of floating plant owned by the United States and*

ST. LOUIS, MO.—Continued.

Name or number.	Class and description.	Tonnage.	Dimensions.			Built.	
			Length.	Width.	Depth.	When.	Where.
			Ft. in.	*Ft. in.*	*Ft. in.*		
No. 25	Pile driver	41.00	68 0	20 0	3 6	1893	St. Louis, Mo.
No. 26	do	41.00	68 0	20 0	3 6	1893	do.
No. 28	do	41.00	68 0	20 0	3 6	1893	do.
No. 29	do	41.00	68 0	20 0	3 6	1893	do.
No. 30	do	41.00	68 0	20 0	3 6	1893	do.
No. 31	do	41.00	68 0	20 0	3 6	1893	do.
No. 32	do	41.00	68 0	20 0	3 6	1893	do.
No. 33	do	41.00	68 0	20 0	3 6	1893	do.
No. 34	do	41.00	68 0	20 0	3 6	1893	do.
No. 35	do	41.00	68 0	20 0	3 6	1893	do.
No. 1	Derrick boat	41.00	68 0	20 0	3 6	1893	do.
No. 2	do	41.00	68 0	20 0	3 6	1894	do.
	1 machine-shop boat	41.00	68 0	20 0	3 6	1909	do.
	60 flats		40 0	16 0	2 6	1900	Leavenworth, Ind.
	8 steel flats		55 0	16 0	3 0	1903	St. Louis, Mo.
	1 yawl		25 0	4 8	2 6	1893	St. Joseph, Mich.
	5 yawls		20 0	5 5	2 6	1894	St. Louis, Mo.
	15 yawls		20 0	5 5	2 6	1898	do.
	19 skiffs		19 9	5 3	1 4	1893	St. Joseph, Mich.
	30 skiffs		19 9	5 3	1 4	1894	St. Louis, Mo.
	12 skiffs		19 9	4 8	1 4	1895	do.
	2 skiffs		24 0	4 8	1 4	1895	do.
	1 skiff		24 0	4 8	1 4	1896	do.
	do		23 4	5 10	1 6	1909	do.
	2 launches		28 0	6 6	3 0	1909	Grafton, Ill.

ST. LOUIS, MO.—(MISSISSIPPI RIVER COMMISSION).

Mississippi	Stern-wheel steamer	390.14	174 0	32 0	6 0	[a]1882	Carondelet, Mo.
Gen. T. L. Casey	do	125.00	143 0	28 0	4 0	1894	Jeffersonville, Mo.
Sachem	Stern-wheel towboat	338.39	171 6	36 0	5 6	1899	Dubuque, Iowa.
Choctaw	do	338.39	171 6	36 0	5 6	1899	do.
Wynoka	do	338.39	171 6	36 0	5 6	[b]1899	do.
Nokomis	do	338.39	171 6	36 0	5 6	1899	do.
Leota	do	338.39	171 6	36 0	5 6	1899	do.
Patrol	Stern-wheel steamer	163.00	130 8	28 0	4 9	[c]1833	Pittsburg, Pa.
Search	do	149.80	120 6	22 3	4 0	1893	Marietta, Ohio.
Vulcan	Stern-wheel steamer (small tenders).	50.00	80 0	17 0	3 9	1897	Dubuque, Iowa.
Mercury	do	50.00	80 0	17 0	3 9	1899	Jeffersonville, Ind.
Venus	do	50.00	80 0	17 0	3 9	1899	do.
Mars	do	50.00	80 0	17 0	3 9	1899	do.
Beta	Hydraulic dredge	[d]1,280.00	214 0	58 0	6 11	[e]1896	Memphis, Tenn.
Gamma	do	640.00	138 0	38 0	7 10	1897	Jeffersonville, Ind.
Delta	do	930.00	175 0	38 0	8 4	1897	Clifton Terrace, Ill.
Epsilon	do	665.00	157 0	40 0	7 6	1898	Grafton, Ill.
Zeta	do	665.00	157 0	40 0	7 6	1898	do.
Iota	Self-propelling hydraulic dredge.	860.00	192 0	44 0	7 0	1900	do.
Kappa	do	860.00	192 0	44 0	7 0	1901	do.
Henry Flad	do	860.00	192 0	44 0	7 0	1901	do.

[a] Upper works burned 1892; rebuilt 1893, St. Louis, Mo.
[b] Upper works burned October 15, 1901; rebuilt at Jeffersonville, Ind., March-June, 1903. Upper works damaged by sinking, November 23, 1908; rebuilt at New Orleans, La., December, 1908-June, 1909.
[c] Rebuilt 1895 at Jeffersonville, Ind. Hull rebuilt 1904 at Paducah, Ky.

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employed in the Engineer Department at Large on June 30, 1910—Continued.

ST. LOUIS, MO.—Continued.

Purchased. When.	Purchased. Where.	Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
.....	.....	Wood.	$3,590.00	$500.00	Poor..	Mississippi River.	Improving Mississippi River from mouth of Ohio River to Minneapolis, Minn., and between mouths of Ohio and Missouri rivers.
.....	.....	...do...	3,590.00	850.00	...do...	.....do.....	Do.
.....	.....	...do...	3,590.00	850.00	...do...	.....do.....	Do.
.....	.....	...do...	3,590.00	850.00	...do...	.....do.....	Do.
.....	.....	...do...	3,590.00	700.00	...do...	.....do.....	Do.
.....	.....	...do...	3,590.00	850.00	...do...	.....do.....	Do.
.....	.....	...do...	3,590.00	850.00	...do...	.....do.....	Do.
.....	.....	...do...	3,590.00	800.00	...do...	.....do.....	Do.
.....	.....	...do...	3,590.00	500.00	...do...	.....do.....	Do.
.....	.....	...do...	4,000.00	1,450.00	Fair..	.....do.....	Do.
.....	.....	...do...	4,000.00	1,895.10	...do...	.....do.....	Do.
.....	.....	...do...	2,201.12	2,201.12	Good..	.....do.....	Do.
.....	.....	...do...	19,140.00	6,177.80	Poor..	.....do.....	Do.
.....	.....	Steel.	18,932.61	9,094.87	Good..	.....do.....	Do.
.....	.....	Wood.	105.00	37.62	Fair..	.....do.....	Do.
.....	.....	...do...	450.00	90.00	Poor..	.....do.....	Do.
.....	.....	...do...	1,275.00	500.00	...do...	.....do.....	Do.
.....	.....	...do...	568.00	125.00	...do...	.....do.....	Do.
.....	.....	...do...	900.00	260.00	...do...	.....do.....	Do.
.....	.....	...do...	360.00	125.00	...do...	.....do.....	Do.
.....	.....	...do...	120.00	40.00	...do...	.....do.....	Do.
.....	.....	...do...	100.00	25.00	...do...	Mississippi, Atchafalaya and Old rivers.	Removing obstructions, Mississippi, Atchafalaya and Old rivers.
.....	.....	Steel..	100.00	90.00	Good..	.....do.....	Do.
.....	.....	...do...	1,038.00	900.00	...do...	.....do.....	Do.

ST. LOUIS, MO.—(MISSISSIPPI RIVER COMMISSION).

.....	.....	Steel hull.	$45,000.00	$14,650.00	Good..	Mississippi River, between Cairo and Head of Passes.	Improving Mississippi River, under Mississippi River Commission, works in charge of Secretary.
.....	.....	Wood.	21,450.00	3,500.00	Fair..	.....do.....	Do.
.....	.....	Steel hull.	45,672.00	22,100.00	Good..	.....do.....	Do.
.....	.....	...do...	45,672.00	22,100.00	...do...	.....do.....	Do.
.....	.....	...do...	45,672.00	22,100.00	...do...	.....do.....	Do.
.....	.....	...do...	45,672.00	22,100.00	...do...	.....do.....	Do.
.....	.....	...do...	45,672.00	22,100.00	...do...	.....do.....	Do.
1883	St. Louis, Mo...	Wood.	14,550.00	4,000.00	...do...	.....do.....	Do.
1895	.....do.....	...do...	9,000.00	4,500.00	...do...	.....do.....	Do.
.....	.....	Steel hull.	7,080.00	3,500.00	...do...	.....do.....	Do.
.....	.....	...do...	7,749.00	3,500.00	...do...	.....do.....	Do.
.....	.....	...do...	7,749.00	3,500.00	...do...	.....do.....	Do.
.....	.....	...do...	7,749.00	3,500.00	...do...	.....do.....	Do.
.....	.....	...do...	218,782.25	96,000.00	...do...	.....do.....	Do.
.....	.....	...do...	85,530.60	32,000.00	...do...	.....do.....	Do.
.....	.....	...do...	124,940.00	44,400.00	...do...	.....do.....	Do.
.....	.....	...do...	102,000.00	39,150.00	...do...	.....do.....	Do.
.....	.....	...do...	109,000.00	38,650.00	...do...	.....do.....	Do.
.....	.....	...do...	100,479.79	49,500.00	...do...	.....do.....	Do.
.....	.....	...do...	122,400.00	83,000.00	...do...	.....do.....	Do.
.....	.....	...do...	122,400.00	98,800.00	...do...	.....do.....	Do.

d Gross.
e Rebuilt 1898, Des Moines Rapids Canal Dry Dock.
f Upper works burned January 11 1908; rebuilt at West Memphis, Ark., February, 1908–June, 1909.

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TABLE V.—*Statement of floating plant owned by the United States and*

ST. LOUIS, MO.—(MISSISSIPPI RIVER COMMISSION)—Continued.

Name or number.	Class and description.	Tonnage.	Dimensions. Length.	Width.	Depth.	Built. When.	Where.
			Ft. in.	*Ft. in.*	*Ft. in.*		
B. M. Harrod	Self-propelling hydraulic dredge.	a1,160.00	210 0	44 0	8 6	1907	Grafton, Ill.
971	Pile sinker	(b)	76 0	25 0	3 10	1897	Cincinnati, Ohio.
981	do	(b)	76 0	25 0	3 10	1898	do.
982	do	(b)	76 0	25 0	3 10	1898	do.
983	do	(b)	76 0	25 0	3 10	1898	do.
13	do	41.00	68 0	20 0	3 6	1894	do.
Illinois	Survey boat	(b)	113 0	18 0	4 0	(d)	
041	Barge	(b)	80 0	20 0	4 0	1904	West Memphis, Ark.
051	do	(b)	80 0	20 0	4 0	1905	do.

ST. PAUL, MINN.

Ogama	Stern-wheel steamboat	106.00	112 6	23 3	4 0	1887	Grand Forks, N. Dak.
Otter Tail	Dipper dredge	120.00	75 0	24 0	6 0	1882	do.
Quarter boat No. 2	House boat	36.00	48 0	16 0	3 6	1882	Moorhead, Minn.
Slide scow No. 1	Decked barge with slide.	20.00	64 6	16 0	3 6	1882	Grand Forks, N. Dak.
Barge No. 5	Decked barge	20.00	64 4	16 0	3 6	1892	do.
St. Croix	Stern-wheel hydraulic pump dredge.	130.00	80 0	22 0	5 0	1898	St. Paul Park, Minn.
3 barges	Conveyor pipe barges	e 3.00	24 0	8 0	2 3	1900	Fort Snelling, Minn.
Barge	Wood barge	18.00	50 0	14 0	3 6	1898	St. Paul Park, Minn.
No. 3	Barge	24.00	52 0	16 0	3 5	1905	St. Paul, Minn.
Barge	do	22.00	60 0	12 0	3 0	1899	Leech Lake Dam.
Do	do	22.00	60 0	12 0	3 0	1900	do.
Warroad	Stern-wheel suction dredge.	260.00	100 0	27 0	8 6	1904	Warroad, Minn.
11 pipe floats	Pipe floats, with pipe and connections.	4.00	24 0	10 0	2 4	1904	do.
1 barge	Wood barge	15.00	50 0	14 0	2 11	1904	do.
Do	Derrick boat	15.00	50 0	14 0	2 11	1906	do.

VICKSBURG, MISS.

Arthur Hider	Stern-wheel towboat	246.01	140 0	30 0	6 0	1898	Jeffersonville, Ind.
H. St. L. Coppée	do	246.01	140 0	30 0	6 0	1904	do.
Control f	Stern-wheel steamboat	99.00	136 0	29 0	4 0	1905	do.
C. W. Howell	Stern-wheel snag boat	275.00	146 0	36 0	5 0	a1881	South St. Louis, Mo.
Thos. B. Florence	do	60.00	96 0	20 0	4 0	a1875	do.
Columbia m	do	75.00	121 0	26 0	3 3	a1877	Gainsville, Miss.

a Gross.
b Nominal.
c Approximate.
d Unknown. Hull rebuilt 1895 at Madison, Ind.
e Unknown.
f Without machinery, machinery was taken from condemned steamboat pertaining to reservoirs at headwaters of Mississippi River.

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employed in the Engineer Department at Large on June 30, 1910—Continued.

ST. LOUIS, MO.—(MISSISSIPPI RIVER COMMISSION—Continued.

Purchased. When.	Purchased. Where.	Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
.....	.....	Iron and steel hull.	$238,998.17	$208,000.00	Good..	Mississippi River, between Cairo, and Head of Passes.	Improving Mississippi River, under Mississippi River Commission, works in charge of Secretary.
.....	.....	Wood.	2,165.00	600.00	...do...	.....do.....	Do.
.....	.....	...do...	c 2,384.00	250.00	...do...	.....do.....	Do.
.....	.....	...do...	c 2,384.00	250.00	...do...	.....do.....	Do.
.....	.....	...do...	c 2,384.00	250.00	...do...	.....do.....	Do.
.....	.....	...do...	4,500.00	800.00	...do...	.....do.....	Do.
.....	.....	...do...	(e)	200.00	Fair...	.....do.....	Do.
.....	.....	...do...	1,205.96	600.00	Good..	.....do.....	Do.
.....	.....	...do...	1,605.47	1,050.00	...do...	.....do.....	Do.
				ST. PAUL, MINN.			
.....	.....	Wood.	f $5,687.06	$4,000.00	Fair...	Red River of the North.	Improving Red River of the North, Minn. and Dak.
.....	.....	...do...	12,600.00	4,500.00	Poor..	.....do.....	Do.
.....	.....	...do...	669.67	400.00	Fair...	.....do.....	Do.
.....	.....	...do...	906.65	400.00	...do...	.....do.....	Do.
.....	.....	...do...	688.95	330.00	...do...	.....do.....	Do.
.....	.....	...do...	6,427.77	4,000.00	Poor..	St. Croix and Minnesota rivers.	Improving St. Croix River, Wis. and Minn.
.....	.....	...do...	h 90.00	h 60.00	Fair...	.....do.....	Do.
.....	.....	...do...	427.20	225.00	...do...	.....do.....	Improving Chippewa River, Wis.
.....	.....	...do...	250.00	150.00	...do...	Lock and Dam No. 2.	Improving Mississippi River between Minneapolis and St. Paul.
.....	.....	...do...	335.00	150.00	...do...	Pokegama Dam...	Reservoirs at headwaters of Mississippi River.
.....	.....	...do...	335.00	150.00	...do...	.....do.....	Do.
.....	.....	...do...	26,500.00	20,000.00	Good..	Warroad Harbor and River.	Improving Warroad Harbor and River, Minn.
.....	.....	...do...	i 2,145.00	i 1,700.00	...do...	.....do.....	Do.
.....	.....	...do...	450.00	360.00	...do...	.....do.....	Do.
.....	.....	...do...	425.00	350.00	...do...	.....do.....	Do.
				VICKSBURG, MISS.			
.....	.....	Steel..	$37,450.00	$26,000.00	Good..	Mississippi River, third district.	Improving Mississippi River.
.....	.....	...do..	53,900.00	37,000.00	...do..	.....do.....	Do.
1906	Paducah, Ky...	Wood.	12,000.00	8,400.00	Fair...	.....do.....	Do.
.....	.....	Iron and steel.	44,650.00	12,000.00	Good..	Red River, La. and Ark.	Improving Red River, La. and Ark.
1875	South St. Louis, Mo.	...do..	14,000.00	4,500.00	...do..	Ouachita River, Ark.	Do.
1888	Shreveport, La..	Wood.	1,800.00	3,300.00	...do..	Yazoo River, Miss.	Improving Ouachita River, Ark. and La., and Yazoo River, Miss.

g Each.
h For 3.
i For 11.
j Formerly No. 202126, Scimitar II.
k Repaired at Dubuque, Iowa, in 1900.
l Repaired at South St. Louis, Mo., in 1885, and at Dubuque, Iowa, in 1900.
m Formerly No. 125676, Col. Hooker.
n Last repaired at Vicksburg, Miss., in 1908.

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TABLE V.—*Statement of floating plant owned by the United States and*

VICKSBURG, MISS.—Continued.

Name or number.	Class and description.	Tonnage.	Dimensions.						Built.	
			Length.		Width.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
Ben Humphreys	Stern-wheel snag and orange-peel dredge boat.	213.72	137	0	32	0	5	0	1908	Jeffersonville, Ind.
Jos. E. Ransdell	do	213.72	137	0	32	0	5	0	1908	do.
Parker[a]	Steam tug	23.73	65	0	16	4	7	2	1885	St. Louis, Mo.
Ouachita[b]	Gasoline launch	9.00	65	5	10	5	3	2	1897	Charleston, W. Va.
Dispatch	Naphtha launch	2.13	21	0	5	4	2	7	1898	New York, N. Y.
No. 569	Hydraulic sand dredge	194.40	120	0	30	0	6	0	1900	Levanna, Ohio.
No. 1	Steam hydraulic grader	157.50	110	0	30	0	5	0	1882	Jeffersonville, Ind.
No. 78	Carpenter boat	112.50	100	0	25	0	5	0	1883	(c)
No. 222	Machine-shop boat	194.40	120	0	30	0	6	0	1883	(c)
No number	Dry dock	(c)	185	0	50	0	11	0	1892	West Elizabeth, Pa.
No. 579	Steam hydraulic grader	194.40	120	0	30	0	6	0	1904	Levanna, Ohio.
No. 1	Steam-derrick boat	76.00	95	0	32	0	2	6	1909	Vicksburg, Miss.
No. 578	do	194.40	120	0	30	0	6	0	1904	Levanna, Ohio.
No. 2	Quarter boat	24.90	59	6	15	6	3	0	1897	Yazoo City, Miss.
No. 3	do	22.20	57	9	16	0	2	8	1897	Camden, Ark.
No. 5	do	38.69	68	3	18	0	3	5	1904	Shreveport, La.
No. 9	do	44.06	68	0	18	0	4	0	1908	do.
No. 10	do	44.06	68	0	18	0	4	0	1908	Jonesville, La.
No. 11	do	44.06	68	0	18	0	4	0	1908	Vicksburg, Miss.
No. 17	do	54.01	85	0	23	0	3	0	1882	Jeffersonville, Ind.
No. 86	do	126.00	100	0	28	0	5	0	1883	(c)
No. 87	do	126.00	100	0	28	0	5	0	1883	(c)
No. 88	do	184.80	120	0	28	0	6	0	1883	(c)
No. 131	do	183.00	131	0	30	0	5	0	1881	Stillwater, Minn.
No. 155	do	184.80	120	0	28	0	6	0	1883	(c)
No. 156	do	184.80	120	0	28	0	6	0	1883	(c)
No. 157	do	184.80	120	0	28	0	6	0	1883	(c)
No. 158	do	184.80	120	0	28	0	6	0	1883	(c)
No. 159	do	184.80	120	0	30	0	6	0	1883	(c)
Nos. 28 and 29	Mattress boats	288.00	160	0	32	0	6	0	1899	Jeffersonville, Ind.
Nos. 30 and 31	do	228.00	140	0	34	0	6	0	1907	do.
Nos. 32 and 33	do	206.55	135	0	34	0	5	0	1908	do.
No. 77	Scow barge	112.50	100	0	25	0	5	0	1882	(c)
No. 111	do	23.30	60	0	15	0	3	0	1884	(c)
No. 564	do	194.40	120	0	30	0	6	0	1894	Levanna, Ohio.
Nos. 566, 567, 568, 571, 572, 573, 574, 575, and 577.	Scow barges	194.40	120	0	30	0	6	0	1900	do.
Nos. 580, 581, 582, 583, 584, 585, 586, 587, 588, and 589.	do	194.40	120	0	30	0	6	0	1904	do.
Nos. 590, 591, 592, and 593.	do	194.40	120	0	30	0	6	0	1907	do.
Nos. 594, 595, 596, and 07X.	do	194.40	120	0	30	0	6	0	1907	do.
Nos. 061, 062, 063, 064, 065, and 066.	do	194.40	120	0	30	0	6	0	1908	do.

[a] Formerly No. 150348.

[b] Formerly No. 92850, Madge.

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employed in the Engineer Department at Large on June 30, 1910—Continued.

VICKSBURG, MISS.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
When.	Where.						
.....	.....	Iron and steel.	$42,483.00	$38,000.00	Good..	Yazoo River, Miss.	Improving Yazoo River, Miss.
.....	.....	...do..	42,483.00	38,000.00	...do..	Ouachita River, La.	Improving Ouachita River, Ark. and La.
1890	St. Louis, Mo...	Wood.	6,500.00	3,700.00	Fair...	Mississippi River, third district.	Improving Mississippi River.
1903	Charleston, W. Va.	Steel..	5,490.00	5,000.00	Good..	Yazoo River, Miss.	Improving Ouachita River, Ark. and La.
1901	Vicksburg, Miss.	Wood.	650.00	100.00	Bad...	Ouachita River, Ark.	Improving Yazoo River, Miss.
.....	.....	...do..	3,700.00	3,000.00	Fair...	.....do.....	Improving Mississippi River.
.....	.....	...do..	5,090.00	4,000.00	...do..	Mississippi River, third district.	Do.
.....	.....	...do..	(a)	2,000.00	...do..	.....do.....	Do.
.....	.....	...do..	(a)	3,600.00	...do..	.....do.....	Do.
.....	.....	...do..	13,657.00	400.00	Bad...	.....do.....	Do.
.....	.....	...do..	15,000.00	13,500.00	Good..	.....do.....	Do.
.....	.....	...do..	3,200.00	3,000.00	...do..	Big Sunflower River, Miss.	Improving Big Sunflower River, Miss.
.....	.....	...do..	3,184.00	2,500.00	Fair...	Ouachita River, Ark.	Improving Mississippi River.
.....	.....	...do..	650.00	600.00	Good..	Tallahatchie River, Miss.	Improving Yazoo River, Miss.
1897	Camden, Ark...	...do..	600.00	600.00	...do..	Ouachita River, La.	Improving Ouachita River, Ark. and La.
.....	.....	...do..	1,810.00	1,100.00	...do..	Red River, Ark...	Improving Red River, La. and Ark.
.....	.....	...do..	1,300.00	1,000.00	...do..	.....do.....	Do.
.....	.....	...do..	1,400.00	1,000.00	...do..	Ouachita River, Ark.	Improving Ouachita River, Ark. and La.
.....	.....	...do..	1,500.00	1,100.00	...do..	Yazoo River, Miss.	Improving Big Sunflower River, Miss.
.....	.....	...do..	(a)	300.00	Bad...	Mississippi River, third district.	Improving Mississippi River.
.....	.....	...do..	(a)	1,500.00	Fair...	.....do.....	Do.
.....	.....	...do..	(a)	2,700.00	...do..	.....do.....	Do.
.....	.....	...do..	(a)	2,800.00	...do..	.....do.....	Do.
.....	.....	...do..	5,000.00	1,750.00	...do..	.....do.....	Do.
.....	.....	...do..	(a)	2,900.00	...do..	.....do.....	Do.
.....	.....	...do..	(a)	2,900.00	...do..	.....do.....	Do.
.....	.....	...do..	(a)	1,400.00	...do..	.....do.....	Do.
.....	.....	...do..	(a)	2,200.00	...do..	.....do.....	Do.
.....	.....	...do..	(a)	2,700.00	...do..	.....do.....	Do.
.....	.....	...do..	4,705.00	900.00	...do..	.....do.....	Do.
.....	.....	...do..	6,956.00	4,900.00	Good..	.....do.....	Do.
.....	.....	...do..	6,900.00	6,200.00	...do..	.....do.....	Do.
.....	.....	...do..	(a)	1,300.00	...do..	Ouachita River, Ark.	Do.
.....	.....	...do..	750.00	450.00	Fair...	Mississippi River, third district.	Do.
.....	.....	...do..	2,970.00	2,000.00	...do..	.....do.....	Do.
.....	.....	...do..	2,846.00	2,200.00	...do..	.....do.....	Do.
.....	.....	...do..	3,184.00	2,000.00	...do..	.....do.....	Do.
.....	.....	...do..	3,972.00	3,000.00	Good	.....do.....	Do.
.....	.....	...do..	4,200.00	3,400.00	...do..	.....do.....	Do.
.....	.....	...do..	4,200.00	3,800.00	...do..	.....do.....	Do.

a Not known.

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TABLE V.—*Statement of floating plant owned by the United States and*

VICKSBURG, MISS.—Continued.

Name or number.	Class and description.	Tonnage.	Dimensions.			Built.	
			Length.	Width.	Depth.	When.	Where.
			Ft. in.	Ft. in.	Ft. in.		
No. 116	Scow barge	80.00	60 0	20 0	4 0	1907	Vicksburg, Miss.
No. 9081	do	39.00	50 0	20 0	4 0	1908	do
Nos. 9082 and 9084	Scow barges	115.00	100 0	25 0	5 0	1908	do
Nos. 9083 and 9085	do	71.00	60 0	25 0	5 0	1908	do
No. 9086	Scow barge	72.00	100 0	20 0	4 0	1905	Monroe, La.
No. 9087	do	54.00	50 0	30 0	4 0	1906	do
No. 9088	do	72.00	100 0	20 0	4 0	(a)	(a)
Nos. 9089 and 90810	Scow barges	36.00	50 0	20 0	4 0	(a)	(a)
No. 90811	Scow barge	97.20	90 0	30 0	4 0	(a)	(a)
No. 90812	do	32.40	50 0	24 0	3 0	(a)	(a)
No. 90813	do	108.00	100 0	24 0	5 0	(a)	(a)
No. 90814	do	54.00	50 0	30 0	4 0	(a)	(a)
Nos. 101, 102, 103, 104, and 105.	Scow barges	194.40	120 0	30 0	6 0	1910	Keokuk, Iowa
No. 109	Scow barge	28.80	64 0	16 0	3 0	1910	do
	WASHINGTON, D. C.						
General Warren	Steam launch	38.19	72 2	17 0	5 0	1888	Peekskill, N. Y.
Not named	Derrick pile driver and boat, self-propelling (included in cost, 1 scow and 2 flatboats).		66 8	22 0	4 0	1891	Petersburg, Va.
Chipeta	Steam yacht	44.00	66 0	14 0	8 1	1893	Jamestown, R. I.
Not named	Gasoline launch	7.00	30 0	7 6	3 1	(b)	
Dalecarlia	Hydraulic dredge, 10-inch.		66 0	24 0	6 0	1908	Washington, D. C.
Not named	Pile driver (included in cost, 1 scow).		53 5	20 1	3 10	1899	Chesapeake Beach, Md.
Engineer	Naptha launch		30 0	6 6	2 8	1898	Gas Engine & Power Co., New York City.
Pontonier	Steamboat		80 0	18 0	3 6	1903	Gas Engine & Power Co. and Chas. L. Seabury & Co., Sons, New York City.

a Not known.

b Unknown.

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employed by the Engineer Department at Large on June 30, 1910—Continued.

VICKSBURG, MISS.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
When.	Where.						
.....	.....	Wood..	$2,100.00	$1,500.00	Fair ..	Tallahatchie River, Miss.	Improving Big Sunflower River, Miss.
.....	.....	...do..	1,200.00	1,000.00	Fair...	Ouachita River, Ark.	Improving Ouachita River Ark. and La.
.....	.....	...do..	2,600.00	2,000.00	...do..	.....do.....	Do.
.....	.....	...do..	1,700.00	1,300.00	...do..	.....do.....	Do.
1908	Monroe, La.....	...do..	600.00	700.00	...do..	Ouachita River, La.	Do.
1908	.....do.....	...do..	500.00	400.00	...do..	.....do.....	Do.
1908	.....do.....	...do..	300.00	500.00	...do..	.....do.....	Do.
1908	.....do.....	...do..	135.00	250.00	...do..	.....do.....	Do.
1908	.....do.....	...do..	260.00	400.00	...do..	.....do.....	Do.
1908	.....do.....	...do..	100.00	200.00	...do..	.....do.....	Do.
1908	.....do.....	...do..	100.00	600.00	...do..	.....do.....	Do.
1908	.....do.....	...do..	500.00	300.00	...do..	.....do.....	Do.
.....	.....	...do..	3,650.00	3,650.00	Good..	Mississippi River, third district.	Improving Mississippi River.
.....	.....	...do..	850.00	850.00	...do..	.....do.....	Do.

WASHINGTON, D. C.

1888	Peekskill, N. Y..	Wood.	$5,500.00	$2,000.00	Fair...	Potomac River and certain rivers on western shore of Chesapeake Bay and defenses of Washington, D. C.	River and harbor works.
1891	Petersburg, Va..	...do...	6,129.75	2,500.00	(c)	Rappahannock, York, Mattaponi, and Pamunkey rivers, Va.	River and harbor works, Rappahannock River, Va.
1906	Boston, Mass....	...do...	(b)	5,500.00	Good..	James River, Va..	River and harbor works, James River, Va.
1907	Norfolk, Va.....	...do...	800.00	1,000.00	...do...	Rappahannock River, Va.	Do.
1908	Washington, D. C.	...do...	26,400.00	26,400.00	...do...	Washington Aqueduct (Dalecarlia reservoir).	Washington Aqueduct.
1907	.....do.....	...do...	2,650.00	2,000.00	Fair...	Rappahannock, York, Mattaponi, and Pamunkey rivers, Va.	River and harbor works, Rappahannock River, Va.
1898	New York City..	...do..	1,800.00	1,040.00	Good..	Washington Barracks, D. C.	Instruction of engineer troops at the Engineer Schools Washington Barracks, D. C.
1903	.....do.....	Steel..	18,750.00	13,550.00	Very good.	.....do.....	Do.

c Being rebuilt.

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TABLE V.—*Statement of floating plant owned by the United States and*

WHEELING, W. VA.

Name or number.	Class and description.	Tonnage.	Dimensions.			Built.	
			Length.	Width.	Depth.	When.	Where.
			Ft. in.	Ft. in.	Ft. in.		
James Rumsey	Towboat	125.00	120 0	22 0	4 3	1903	Charleston, W. Va.
Addison	Dipper dredge	160.00	75 0	30 0	6 3	1880	On Kanawha River.
21	Crane boat	65.00	80 0	22 0	3 4	1899	Charleston, W. Va.
26	Dump boat (side)	100.00	58 0	20 0	5 9	1902	Middleport, Ohio.
27	do	100.00	58 0	20 0	5 9	1906	Point Pleasant, W. Va.
24	Flatboat (decked)	55.00	70 0	16 0	3 4	1895	Charleston, W. Va.
25	do	80.00	80 0	18 0	3 4	1900	Middleport, Ohio.
4A2	Service boat	30.00	59 0	20 0	2 4½	1908	Charleston, W. Va.
5A	do	25.00	50 0	20 0	2 4½	1901	Middleport, Ohio.
6A2	do	30.00	59 0	20 0	2 4½	1907	Charleston, W. Va.
7A	do	25.00	50 0	20 0	2 4½	1901	Middleport, Ohio.
8A2	do	30.00	59 0	20 0	2 4½	1902	do
9A	do	25.00	60 0	16 0	2 4	1898	Charleston, W. Va.
9A2	do	30.00	59 0	20 0	2 4½	1908	do
10A2	do	30.00	59 0	20 0	2 4½	1905	do
11A2	do	30.00	59 0	20 0	2 4½	1905	do
2 B 2	do	6.00	40 0	7 4	2 1½	1908	do
3 B 2	do	6.00	40 0	7 4	2 1½	1908	do
4 B 2	do	6.00	40 0	7 4	2 1½	1903	do
7 B	do	6.00	40 0	7 6	2 1	1894	do
7 B 2	do	6.00	40 0	7 4	2 1	1910	Lock No. 7, W. Va.
8 B	do	6.00	40 0	7 6	2 1	1894	Charleston, W. Va.
8 B 2	do	6.00	40 0	7 4	2 1	1910	Lock No. 8, W. Va.
9 B	do	6.00	40 0	7 4	2 1	1898	Montgomery, W. Va.
10 B	do	6.00	40 0	7 4	2 1	1898	do
10 B 2	do	6.00	40 0	7 4	2 0	1909	Lock No. 10, W. Va.
11 B	do	6.00	40 0	7 4	2 1	1898	Montgomery, W. Va.
11 B 2	do	6.00	40 0	7 4	2 1	1910	Lock No. 11, W. Va.
5 B 2	Push boat	6.00	40 0	7 4	2 1½	1902	Middleport, Ohio.
6 B	do	6.00	40 0	7 4	2 1½	1902	do
Mascot	Steam launch	7.00	61 0	8 0	3 7	1893	Charleston, W. Va.
L. K. No. 1	Flatboat		30 0	7 0	2 0	1903	Burnsville, W. Va.
L. K. No. 3	do	80.00	88 0	19 6	4 0	1905	Point Pleasant, W. Va.
L. K. No. 4	do		60 0	8 0	1 8		
L. K. No. 5	do		56 0	7 0	1 8		
L. K. No. 6	do		48 0	8 0	1 8		
L. K. No. 2	do	100.00	96 0	17 6	4 3	1903	Beverly, Ohio
Loma	Stern-wheel steamboat	31.00	83 0	15 7	4 7	1899	Cincinnati, Ohio.
U. S. E. Wheeling No. 10.	Maneuver boat		60 0	22 0	3 8	1909	Elizabeth, Pa.
U. S. E. Wheeling No. 19.	Flatboat		41 9	14 0	3 0	1910	Dam No. 13, Ohio River.
U. S. E. Wheeling No. 11.	Maneuver boat		60 0	22 0	3 8	1909	Elizabeth, Pa.
U. S. E. Wheeling No. 13.	Flatboat		46 0	22 6	3 0		

[a] Secondhand.

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employed in the Engineer Department at Large on June 30, 1910—Continued.

WHEELING, W. VA.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
When.	Where.						
1903	Charleston, W. Va.	Steel..	$28,000.00	$25,000.00	Good..	Kanawha River, W. Va.	Kanawha River improvement.
.....	.....	Wood.	12,000.00	4,000.00	Hull and cabin worthless.	.....do.....	Do.
1899	Charleston, W. Va.	...do...	1,250.00	150.00	Poor..	.....do.....	Do.
1902	Middleport, Ohio.	...do...	2,250.00	900.00	Fair...	.....do.....	Do.
1906	Point Pleasant, W. Va.	...do...	1,850.00	1,300.00	Good..	.....do.....	Do.
1895	Charleston, W. Va.	...do...	445.00	100.00	Poor..	.....do.....	Do.
1900	Middleport, Ohio.	...do...	825.00	250.00	Fair...	.....do.....	Do.
1908	Charleston, W. Va.	...do...	900.00	800.00	Good..	.....do.....	Do.
1901	Middleport, Ohio.	...do...	575.00	200.00	Fair...	.....do.....	Do.
1907	Charleston, W. Va.	...do...	750.00	650.00	Good..	.....do.....	Do.
1901	Middleport, Ohio.	...do...	575.00	125.00	Poor..	.....do.....	Do.
1902	.....do.....	...do...	650.00	325.00	Fair...	.....do.....	Do.
1898	Charleston, W. Va.	...do...	410.00	.....	Worthless.	.....do.....	Do.
1908	.....do.....	...do...	900.00	800.00	Good..	.....do.....	Do.
1905	.....do.....	...do...	700.00	500.00	...do...	.....do.....	Do.
1905	.....do.....	...do...	700.00	500.00	...do...	.....do.....	Do.
1908	.....do.....	Wood.	200.00	175.00	Good..	.....do.....	Do.
1908	.....do.....	...do...	200.00	175.00	...do...	.....do.....	Do.
1903	.....do.....	...do...	190.00	60.00	Fair...	.....do.....	Do.
1894	.....do.....	...do...	110.00	.....	Worthless.	.....do.....	Do.
.....	.....	...do...	106.00	106.00	New..	.....do.....	Do.
1894	Charleston, W. Va.	...do...	110.00	.....	Worthless.	.....do.....	Do.
.....	.....	...do...	105.00	105.00	New..	.....do.....	Do.
1898	Montgomery, W. Va.	...do...	107.00	.....	Worthless.	.....do.....	Do.
1898	.....do.....	...do...	107.00	.....	...do...	.....do.....	Do.
.....	.....	...do...	117.00	117.00	New..	.....do.....	Do.
1898	Montgomery, W. Va.	...do...	107.00	.....	Worthless.	.....do.....	Do.
.....	.....	...do...	110.00	110.00	New..	.....do.....	Do.
1902	Middleport, Ohio	...do...	175.00	60.00	Fair...	.....do.....	Do.
1902	.....do.....	...do...	175.00	60.00	...do...	.....do.....	Do.
1893	Charleston, W. Va.	Steel..	4,650.00	1,000.00	...do...	Dam No. 26, Ohio River.	Do.
1903	Burnsville, W. Va.	Wood.	65.00	30.00	...do...	Little Kanawha River, W. Va.	Little Kanawha River improvement.
1907	Point Pleasant, W. Va.	...do...	700.00	300.00	...do...	.....do.....	Do.
1909	Stouts Mill, W. Va.	...do...	a 210.00	175.00	Good..	.....do.....	Do.
1909	.....do.....	...do...	a 140.00	100.00	...do...	.....do.....	Do.
1909	.....do.....	...do...	a 140.00	100.00	...do...	.....do.....	Do.
1906	Beverly, Ohio...	...do...	a 600.00	250.00	Poor..	Dam No. 18, Ohio River.	Do.
1906	Pittsburg, Pa....	...do...	5,000.00	6,000.00	Good..	Dam No. 26, Ohio River.	Do.
1909	.....do.....	...do...	5,629.00	5,400.00	...do...	Dam No. 13, Ohio River.	Ohio River improvement.
.....	.....	...do...	400.00	400.00	New..	.....do.....	Do.
1909	Pittsburg, Pa...	...do...	6,200.00	6,000.00	Good..	Dam No. 18, Ohio River.	Do.
1909	Parkersburg, W. Va.	...do...	a 50.00	.....	Worthless.	.....do.....	Do.

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TABLE V.—*Statement of floating plant owned by the United States and*

WHEELING, W. VA.—Continued.

Name or number.	Class and description.	Tonnage.	Dimensions.			Built.	
			Length.	Width.	Depth.	When.	Where.
			Ft. in.	Ft. in.	Ft. in.		
U. S. E. Wheeling No. 14.	Flatboat		90 0	16 0	5 10		
L. C. Wolfe	Clam-shell dredge		60 6	32 6	4 7		
U. S. E. Wheeling No. 2.	Derrick boat		70 6	32 0	4 0		
U. S. E. Wheeling No. 3.	Derrick boat and pile-driver.		70 6	30 7	4 6		
U. S. E. Wheeling No. 1.	Flatboat		90 0	16 0	4 7		
U. S. E. Wheeling No. 4.	do		60 8	32 6	5 0		
U. S. E. Wheeling No. 5.	Flatboat (decked)		85 0	20 0	4 6		
U. S. E. Wheeling No. 6.	Flatboat		90 9	16 0	4 2		
U. S. E. Wheeling No. 7.	do		90 0	16 0	4 4	1909	Dam No. 26, Ohio River.
U. S. E. Wheeling No. 8.	Flatboat (decked)		75 0	16 0	3 10	1909	do
U. S. E. Wheeling No. 9.	do		75 0	16 0	3 10	1909	do
U. S. E. Wheeling No. 12.	Flatboat		30 0	10 0	1 0		
U. S. E. Wheeling No. 15.	do		90 0	16 0	4 7	1910	Dam No. 26, Ohio River.
U. S. E. Wheeling No. 16.	do		90 0	16 0	4 7	1910	do
U. S. E. Wheeling No. 17.	do		90 0	16 0	4 7	1910	do
U. S. E. Wheeling No. 18.	do		90 0	16 0	4 7	1910	do

WILMINGTON, DEL.

Hinda	Gasoline launch		28 0	7 6	2 3	1907	Morris Heights, N.Y.

WILMINGTON, N. C.

Ajax	Clamshell dredge	175.00	82 6	32 6	9 3	1884	Port Royal, S. C.
Cape Fear	Seagoing, propeller suction dredge.	203.80	131 3	29.0	12 0	1895	Philadelphia, Pa.
Gen. C. B. Comstock	do	764.00	177 0	35 6	16 0	1895	Perth Amboy, N. J.
Hercules	Clamshell dredge	466.40	100 0	40 0	11 8	1907	Jersey City, N. J.
Jacksonville	Hydraulic dredge	680.00	138 4	40 8	10 2	1904	Jacksonville, Fla.
Scuppernong	Grapple dredge	128.00	78 0	32 0	7 0	1904	Newbern, N. C.
Coquet	Steam tug	42.00	58 0	18 6	7 0	1906	Madison, Md.
Cynthia	do	29.35	74 7	17 2	7 6	1891	Baltimore, Md.
Richard Caswell	do	60.00	84 10	18 6	10 0	1900	do

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employed in the Engineer Department at Large on June 30, 1910—Continued.

WHEELING, W. VA.—Continued.

Purchased. When.	Purchased. Where.	Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
1909	Parkersburg, W. Va.	Wood.	$a 125.00	.....	Worthless.	Dam No. 18, Ohio River.	Ohio River improvement.
1908	Pittsburg, Pa.	...do...	a 4,000.00	$4,500.00	Good..	Dam No. 26, Ohio River.	Do.
1908	Parkersburg, W. Va.	...do...	a 3,200.00	1,800.00	Fair...	.....do.....	Do.
1908	.....do.....	...do...	a 2,000.00	1,800.00	...do...	.....do.....	Do.
1909	.....do.....	...do...	a 100.00	.....	Worthless.	.....do.....	Do.
1908	.....do.....	...do...	a 900.00	500.00	Fair...	.....do.....	Do.
1908	.....do.....	...do...	a 750.00	500.00	Good..	.....do.....	Do.
1908	.....do.....	...do...	a 475.00	.....	Worthless.	.....do.....	Do.
.....	.....	...do...	799.00	725.00	Good..	.....do.....	Do.
.....	.....	...do...	654.00	600.00	...do...	.....do.....	Do.
.....	.....	...do...	654.00	600.00	...do...	.....do.....	Do.
1908	Parkersburg, W. Va.	...do...	a 15.00	10.00	Fair...	.....do.....	Do.
.....	.....	...do...	1,000.00	1,000.00	New..	.....do.....	Do.
.....	.....	...do...	1,000.00	1,000.00	...do...	.....do.....	Do.
.....	.....	...do...	1,000.00	1,000.00	...do...	.....do.....	Do.
.....	.....	...do...	1,000.00	1,000.00	...do...	.....do.....	Do.

WILMINGTON, DEL.

1907	Wilmington, Del.	Wood.	$2,600.00	$2,200.00	Good..	Cold Spring Inlet, N. J.	Improving Cold Spring Inlet, N. J.

WILMINGTON, N. C.

1897	Charleston, S. C.	Wood.	$16,050.00	$18,000.00	Fair...	Cape Fear River, N. C.	Improving Cape Fear River, N. C., at and below Wilmington.
.....	.....	...do..	60,809.30	45,000.00	...do..	Cape Fear River, and Beaufort Inlet, N. C.	Do.
.....	.....	...do..	94,400.00	85,000.00	...do..	Cape Fear River, N. C.	Galveston, Tex., district.
1907	Jersey City, N. J.	...do..	61,350.00	56,000.00	Good..	.....do.....	Improving Cape Fear River, N. C., at and below Wilmington.
.....	.....	...do..	125,000.00	110,000.00	Fair...	.....do.....	Improving St. Johns River, Fla.
.....	.....	...do..	10,300.00	9,000.00	...do..	Newbern, N. C., subdistrict.	Various river and harbor works, Newbern subdistrict.
1907	Baltimore, Md.	...do..	8,000.00	7,000.00	Good..	Cape Fear River, N. C.	Various river and harbor works, Wilmington district.
1897	Charleston, S. C.	...do..	8,500.00	5,000.00	Poor..	.....do.....	Improving Cape Fear River, N. C., at and below Wilmington.
.....	.....	Steel..	26,500.00	23,000.00	Good..	.....do.....	Do.

a Secondhand.

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TABLE V.—*Statement of floating plant owned by the United States and*

WILMINGTON, N. C.—Continued.

Name or number.	Class and description.	Tonnage.	Dimensions.			Built.	
			Length.	Width.	Depth.	When.	Where.
			Ft. in.	Ft. in.	Ft. in.		
Gen. Geo. Thom	Steam launch	24.00	73 0	12 5	4 6	[a]1893	Washington, N. C.
Mercur [b]	do	28.11	83 0	13 3	7 0	1892	New York, N. Y.
Frances	Naphtha launch	4.00	33 0	7 0	3 0	1906	Muskegon, Mich.
Nancy	do	3.49	30 0	6 5	2 0	1903	New York, N. Y.
Polly	do	1.00	16 0	4 6	2 6	1898	Derby, Conn.
Olive	do	3.50	30 2	6 2	2 0	1892	Morris Heights, N.Y.
Gen. H. G. Wright	Snag boat	100.00	102 0	20 6	5 0	[a]1882	Wilmington, N. C.
Trent	do	69.78	70 0	20 0	5 0	1899	Newbern, N. C.
Sunshine	Sharpie	7.00	48 0	12 0	3 0	1889	Smyrna, N. C.
B	Dump scow	145.00	84 8	26 0	10 3	1897	Wilmington, N. C.
D and E	Dump scows	212.00	91 8	26 0	10 0	1907	Jacksonville, Fla.
F and G	do	360.00	125 0	32 0	10 0	1908	Baltimore, Md.
H	Side dump scow	58.67	50 0	22 0	5 4	1900	Newbern, N. C.
I	do	55.77	51 6	20 0	5 9	1900	do
J and K	Side dump scows	96.60	83 0	24 0	7 0	1904	do
C	Deck scow	145.00	84 8	26 0	10 3	1897	Wilmington, N. C.
1	Decked lighter scow	50.00	75 0	20 0	5 0	1895	do
2	do	50.00	75 0	20 0	5 0	1896	do
3	do	75.00	75 8	20 0	5 6	1903	do
4	do	75.00	75 8	20 0	5 6	1903	do
5 and 6	Decked lighter scows	75.00	75 8	20 6	5 6	1907	do
Scow	Hull hoister	70.00	60 0	24 0	5 1	1903	do
Black	Floating hoister	25.00	45 0	20 0	3 9	1910	do

[a] Rebuilt at Newbern, N. C., in 1896.

[b] Formerly Mary Lilly.

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employed in the Engineer Department at Large on June 30, 1910—Continued.

WILMINGTON, N. C.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Where employed.	Work to which belonging.
When.	Where.						
.....	.....	Wood.	$2,500.00	$500.00	Poor..	Neuse River, N. C.	Various river and harbor works, Newbern subdistrict.
1899	New York, N.Y.	Steel..	11,000.00	9,000.00	Good..	Cape Fear River, N. C.	Improving Cape Fear River, N. C., at and below Wilmington.
1908	Beaufort, N. C..	Wood.	600.00	600.00	Fair...	Newbern, N. C., subdistrict.	Various river and harbor works, Newbern subdistrict.
.....	.....	...do..	2,065.25	1,700.00	Good..	Cape Fear River, N. C.	Improving Cape Fear River, N. C., at and below Wilmington.
.....	.....	...do..	550.00	125.00	Ordinary.	Newbern, N. C., subdistrict.	Gun and mortar batteries.
1905	Wilmington, N. C.	...do..	1,700.00	500.00	Fair...	.....do.....	Various river and harbor works, Newbern subdistrict.
.....	.....	...do..	3,000.00	5,000.00	Good..	Northeast, Black, and Cape Fear rivers, N. C.	Improving Northeast, Black, and Cape Fear rivers, N. C.
.....	.....	...do..	8,500.00	3,500.00	Fair...	Newbern, N. C., subdistrict.	Various river and harbor works, Newbern subdistrict.
.....	.....	...do..	4,000.00	25.00	Poor..	.....do.....	Do.
.....	.....	...do..	6,390.00	200.00	Bad...	Cape Fear River, N. C.	Improving Cape Fear River, N. C., at and below Wilmington.
.....	.....	...do..	[d] 16,500.00	12,000.00	Ordinary.	.....do.....	Do.
.....	.....	...do..	[d] 30,650.00	24,000.00	Good..	.....do.....	Do.
.....	.....	...do..	1,056.00	50.00	Poor..	Newbern, N. C., subdistrict.	Improving Pamlico and Tar rivers, N. C.
.....	.....	...do..	1,643.66	50.00	...do..	.....do.....	Do.
.....	.....	...do..	[d] 3,500.00	500.00	...do..	.....do.....	Do.
.....	.....	...do..	5,620.00	2,500.00	Good..	Cape Fear River, N. C.	Improving Cape Fear River, N. C., at and below Wilmington.
.....	.....	...do..	1,000.00	1,000.00	Poor..	.....do.....	Do.
.....	.....	...do..	1,000.00	600.00	...do..	.....do.....	Do.
.....	.....	...do..	1,485.00	1,200.00	...do..	.....do.....	Do.
.....	.....	...do..	1,485.00	1,000.00	...do..	.....do.....	Do.
.....	.....	...do..	[d] 4,450.00	4,000.00	Good..	.....do.....	Do.
.....	.....	...do..	1,485.00	1,000.00	Fair...	.....do.....	Do.
.....	.....	...do..	1,300.00	1,300.00	New..	Black, Northeast, and Cape Fear rivers, N. C.	Improving Northeast, Black, and Cape Fear rivers, N. C., Black River.

[c] Rebuilt in 1895.

[d] For 2.

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APPENDIX B B B.

SUPERVISION OF THE HARBOR OF NEW YORK.

REPORT OF CAPT. C. McR. WINSLOW, U. S. NAVY, SUPERVISOR, FOR THE FISCAL YEAR ENDING JUNE 30, 1910.

WAR DEPARTMENT,
OFFICE OF SUPERVISOR OF HARBOR OF NEW YORK,
New York, July 18, 1910.

SIR: I have the honor to submit the following report of the operations of this office for the fiscal year ending June 30, 1910, together with an estimate of funds required for the fiscal year ending June 30, 1912.

On assuming charge as supervisor, November 9, 1909, I found the patrol force available to consist of six steam tugs and one launch. Four of the tugs, viz, *Lamont*, *Scout*, *Cerberus*, and *Nimrod*, are employed in maintaining a permanent patrol, night and day, of the bay and harbor as far at sea as 5 miles outside Scotland lightship. Another, the *Vigilant*, is utilized in patrolling the Hudson River, East River, and, in addition, Long Island Sound when operations in that direction are absolutely necessary. The sixth, the *Argus*, is used as an auxiliary. This vessel is very old, her machinery obsolete and entirely unreliable, and it is only by careful nursing that she can be kept running for short periods as occasion demands, that she may act as the relief of a regular patrol vessel undergoing repairs.

The naphtha launch *Lookout* is utilized in patrolling Staten Island Kills, Newark Bay, Passaic River, and various shallow tributaries. This little vessel is also useful in investigating points alongshore where pier building or excavating operations are under way and in special investigations where the water is insufficient for the larger vessels.

The office was created under act of Congress of June 29, 1888, the object being the protection of the channels of the harbor of New York, tributary waters, and Long Island Sound from injurious deposits by dumping or otherwise. The functions and powers of the supervisor were extended by amendments to that act, approved August 18, 1894. Further additional duties were conferred by section 2 of said act, requiring the main channels to be kept free from small craft engaged in fishing or dredging for shell-fish, or in any way interfering with the safe navigation of those channels by ocean steamships and other vessels of deep draft. The functions and powers of the office were still further extended by section 8 of act of Congress approved May 28, 1908, as modified by act of Congress

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approved February 16, 1909, requiring certain boats or scows engaged in the transportation of dredgings or all other waste material to be equipped at all times with certain specified articles for the better protection of life and property.

Since the last report there has been no material change in the system of patrol or method of checking adopted, which have been continued along the general lines established some years ago, and which have proven quite effective in keeping under supervision the movement of waste material upon the waters of the harbor and those tributary or adjacent thereto and in enforcing the additional functions of this office prescribed by the acts above referred to.

The millions of tons of refuse material consisting of dredgings from the harbor, excavations on shore, débris from city improvements, and city refuse of all kinds annually transported upon these waters, and the large sums of money appropriated by Congress for the improvement and maintenance of the channels show that a sufficient number of efficient vessels to insure a proper surveillance and strict compliance with all laws adopted for their preservation is a matter not only of absolute necessity, but of economy as well.

Experience has fully demonstrated that the best method to protect the channels from promiscuous dumping is a check on loaded and light scows, together with a permanent and efficient patrol maintained day and night, one vessel patrolling inside the Narrows, while the other vessel patrols in the neighborhood of the prescribed dumping ground, 2 to 5 miles southeast of Scotland lightship. The patrol vessel inside collects the permits and inspects the tows, noting any discrepancies as to load, etc. The outside vessel makes daily reports of tows arriving at the dumping point, giving condition of loads in tow, time of deposit, weather, etc.; and in cases where scows fail to clear, returning to the harbor partially loaded, keeps such tows under surveillance as far as practicable until they are met by the inside boat. The inside boat again picks up the tows on their return, inspects same, and notes condition of scows, especially whether light or partially loaded. These reports are daily checked off in the office, discrepancies readily detected, and the responsible parties required to account for any material lost in transit or unaccounted for. In many instances dumpers arrive at the lightship fully loaded, but on account of defective machinery or refractory material some of the pockets fail to clear, and as it is practically impossible, once opened, to completely close the doors on the bottom of the dumpers, more or less of this material finds its way to the channels. It has been found impracticable to compel such tows to remain on the dumping ground indefinitely. However, since it is well known that the contents of all dumpers must be accounted for before reloading, or by suffering a deduction at the contract price per yard for each cubic yard unaccounted for, either by return to the point of loading to be there measured and proper deductions made, every reasonable effort is made to clear the dumpers before returning into the harbor.

This office receives, on blank forms which it furnishes gratis, reports of loading for work done under municipal, state, and federal departments, and also by a number of private concerns, which are duly checked off with the permits used. This insures a perfect supervision over all such dredging spoils from time of loading until final disposition. There are, however, occasionally, contracts of consid-

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erable extent under operation for private concerns who fail to appreciate the advantages in furnishing this office with the information called for on the blank forms referred to, claiming that they contract for so much depth of water and that the final disposition of the material dredged does not concern them. Such cases necessitate frequent inspections of dredging operations and the filing of reports showing light and loaded dumpers, to be checked off with the permits issued. Where discrepancies are noted further special efforts are then directed to obtain sufficient evidence of irregularity in the disposition of material to warrant reference to the courts with recommendation that proceedings be instituted against the parties responsible. It will therefore be apparent that the transportation and final disposition of material of this class is well covered and that violations of law can not well take place without the knowledge of this office. Could, however, the filling out and filing here of the loading blanks referred to by all parties engaged in the loading and transportation of waste material on the waters of the harbor be made compulsory, instead of, as now, left to the discretion of the parties concerned, the work of this office would be very materially aided and any evasion of the law be rendered proportionately difficult.

There is still, however, a large class of that material most injurious to the channels, technically termed "cellar dirt," which can not be so successfully reached by this system of checking, due to the fact that the contractors in excavating for or razing buildings are largely dependent upon the lessees of the water-front dumps and of the scows to dispose of their débris and excavated material, at so much per cart load, and there is no means of getting from these lessees reports of loading. Consequently, such operations necessitate frequent inspections to keep track of the conditions of the loads of the dumpers at the various dumping boards. This duty devolves on the *Vigilant*, whose master is required to make daily reports on the completion of each tour of duty, showing the dumpers at each slip, time of inspection, and whether light, partially loaded, etc. These reports, in turn, are checked with the permits collected and returned by the patrol boats on duty at sea. In the event of any pockets failing to clear at the proper point of deposit at sea, the patrol boats on duty are required to keep such tows under surveillance until the partially loaded dumper has been returned to the slip.

In all cases where the checking system of loaded and empty dumpers is inapplicable or can not be fully enforced, special efforts are made, to the extent of the available force at the disposal of the supervisor, for frequent inspections to insure an enforcement of the law. As might be expected in such cases where the checking system is not complete, there are quite a number of technical or minor violations that can not well be referred to the courts because of lack of conclusive evidence such as is demanded in criminal procedure to warrant such expensive litigation. Where, however, persistent or willful disregard for law and regulations is evident, the facts, as far as inspections and investigations can elicit, are submitted to the United States district attorney for such action as he may deem proper. Then, too, it is to be borne in mind that failure to bring about conviction and punishment when such cases are brought to trial is most detrimental to the service. Prompt trial and conviction of all cases referred to the courts are of the utmost importance. Delay is hazardous; witnesses

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become dispersed, and lapse of time renders testimony less strong and convincing, and results in an acquittal or a nolle prosequi, either of which is encouraging to those whose tendencies are not those of strictly law-abiding citizens.

Frequently masters of towboats display exceedingly poor judgment and take unnecessary risks in proceeding to sea during the prevalence of bad weather. The discharge of a portion or the whole of the scow loads to prevent their sinking in the heavy seas which break over them, threatening disaster to the scows and hazarding the lives of the scowmen, may then be necessary. All but one of the cases of illegal dumping near the mouth of the harbor referred for the action of the Department of Justice during the past fiscal year were due to masters of tows proceeding to sea disregarding entirely the conditions of weather prevailing and the seaworthiness of the vessels comprising their tows. They assume such unnecessary risk in the interest of their owners, at times without sufficient regard for the lives of the scowmen.

Unfortunately, the master who displays the better judgment and remains under a lee until the storm has passed may meet with the censure of his owners should they hear that another tow has taken a chance and made a successful trip. This acts as an incentive for masters of tows to assume such unnecessary risk for pecuniary gain, whether to the detriment of the channels or otherwise.

Again, there are a few crafty tug masters who resort to every possible means to circumvent the inspectors in their duties in carrying out the law. Experience teaches that it is useless to trust to the inhabitants along shore or to persons employed on the water for any evidence against lawbreakers other than that of a general nature. Our only dependence is on our own force of inspectors. When the weather conditions are bad, temptation to dump illegally is the strongest, and thus it is that the patrol must be kept up at all times and the vessels required to perform this duty ought to be of modern type, seaworthy, and efficient in every particular to enable them to remain outside in all conditions of weather. In this connection I recommend that the estimate asked " for the purchase or construction of a new vessel," as recommended by two of my predecessors, meet with favorable consideration. Such a vessel is sorely needed for sea duty to replace the *Nimrod*, which has now been continuously employed in the service under its most severe conditions for upward of twenty years. As she is a wooden vessel, patched and overhauled yearly, as far as the allotment for the maintenance of the fleet would permit, she has about reached the limit of her usefulness for the severe duty of outside patrol work. But, as recommended by my predecessors, she could be most profitably employed for duty on the Sound for some years, where the necessity for some system of efficient patrol is becoming yearly more imperative owing to the improvements now under operation or in contemplation along the north shore of Long Island. Since the state law prohibits the deposit of any material in the waters of the Sound west of Eatons Neck, the final disposition in the Sound of dredging spoils from points along that shore must necessarily take place to the eastward of that point. To require the constantly increasing quantities of waste material from

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these points along the shore of Long Island to be deposited at the established dumping grounds outside Scotland light-ship, where they would be under proper surveillance, would be so expensive, not to speak of the hazardous trip in bringing such a tow through Hell Gate, that it would prove prohibitive of all development or improvement. It is for these reasons that this office has from time to time granted permits for the final disposition of dredging spoils in the deep water of the Sound to the eastward of Eatons Neck from small operations above Hell Gate. But the supervision is necessarily spasmodic and ineffective, owing to the limited force at the disposal of the supervisor. As these operations in dredging and channel making increase, the necessity for a more rigid supervision in that locality is apparent.

The waters of the harbor of New York have for many years seriously suffered from the lack of a proper system in handling the refuse from the city's streets, and the best efforts of this office have been persistently directed toward securing the adoption of some more sanitary and satisfactory method than the present, which is that of unloading from city carts to deck scows for transportation upon the waters to the point of final disposition in filling in behind bulkheads. The scows used by the city for the transportation of this material are improperly constructed to prevent the loss of material while in transit. As the material is loaded on deck and trimmed up to a height of probably 12 to 14 feet, considerable is lost overboard during the process of loading and unloading, due to negligence in handling or careless trimming or the character of the material, light material being blown off the scows by gusts of wind. Although I am of the opinion that this material has little effect in shoaling, it certainly creates a most filthy and insanitary condition of the waters of the harbor, gradually accumulating and floating out and in with the tide for days, until some particularly strong wind carries it far seaward, to be eventually scattered along the beaches to the annoyance and positive discomfort of the residents and visitors at the summer resorts along the coast.

An arrest was made by a deputy inspector of the *Vigilant* of a foreman of trimmers at a city dump for permitting material to fall overboard during the process of loading, and the case was turned over for the action of the United States attorney for the southern district of New York. The prisoner was released under bail. The object of such an arrest was more to fix responsibility than the punishment of the individual. This action in any case is bound to have a most salutary effect.

In my efforts to eliminate, or at least mitigate, the defilement of the harbor from such sources I have represented the conditions to the city authorities and have received assurances of their cooperation in the work of improvement, and the contractors for the city scow trimming are now required to keep rowboats at each loading slip to pick up any light material getting adrift; and although an improvement in the condition of the waters may not now be perceptible, the rigid enforcement of that requirement, together with a persistent patrol of the water front by this office, should show a decided improvement.

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The transportation of the city's waste has been a fruitful source of trouble and complaint. However, after many vexatious delays the city has, at my suggestion, fitted a deck scow with bins for the reception of light material and is now experimenting with it. Should such prove successful, and I do not doubt that it will, the loss of material upon the waters of the harbor from this source while in transit will be completely eliminated. There is, however, much other injurious matter also that finds its way to the channels, due to the deposit of refuse material from shore, and much of the débris constantly seen floating in the rivers comes from along the water front, being sweepings from docks and the refuse material from vessels at wharves, such as boxes, barrels, dunnage, etc.

The menace to navigation due to floating logs and timbers has been given much attention. In all cases where wharves or docks, involving the removal of all cribwork and spiles, are under construction the contractor has been required to keep a sufficient force of boats to secure such logs as may be brought to the surface, and as these logs are of no value great difficulty is experienced by the contractor in disposing of them. As the deposit of such material at the mouth of the harbor is forbidden by this office, there is much temptation to let them adrift, necessitating a strict surveillance over such work by the force of this office. Timbers once permitted to get away from such work, or washed offshore by freshets or tides, find their way to the upper and lower bays, to float out and in with the tides, and are very difficult to identify. Consequently the difficulties in securing evidence of violation of law by this office in such cases will be apparent.

With the very best of regulations and after the most careful supervision there will remain, owing to negligence on the part of individuals or unavoidable cause, a large amount of floating débris about the surface and in the harbor extending through the channels to the open sea. This débris is unsightly, and when it collects in the slips along the water front may be injurious and insanitary. Much of it is composed of floating boxes, crates, boards, and other light material which would be of value for firewood. With this are heavier timbers, which often cause injury to the propellers of small steamers. There is no provision for collecting this débris, and it remains in the waters of the harbor until a favorable wind and tide takes it to sea, which may be at an early date or may be after much delay. For instance, a short time ago a dead dog was sighted floating off Fourteenth street, North River. Two days afterwards this same dog was seen off Governors Island.

Without question this matter is sufficiently serious to merit early attention, and there should be some system established, whether the expense be borne by the General Government or by the municipal authorities, to obviate this nuisance and maintain a cleanly and sanitary condition of the surface of the harbor waters, both in the channels and adjacent to the wharves. Owing to the fact that the commerce is continually increasing, the pollution of the waters due to this cause is also on the increase and many complaints have been made. I believe that a satisfactory remedy could be applied without much expenditure of money.

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The following table shows deductions made on contracts for material escaping from dumpers while in transit or otherwise improperly disposed of or unaccounted for, viz—

	Cubic yards.
United States Engineer Department	10,312
New York City, department of docks and ferries	2,465
Brooklyn Borough, department of sewers	587
United States Navy Department	214
Private contracts	800
Total	14,378

at an estimated average of 35 cents per cubic yard, amounting to $5,032.30.

Under contracts with above-noted departments 129 pocket loads, averaging 150 cubic yards each, or a total of 19,350 cubic yards, or approximately 32 scow loads, were checked upon reports of the patrol vessels as failing to clear at the proper point outside the light-ship and were kept under surveillance until returned to the point of loading, to be there measured before reloading. This amount of material would have proven a large item of gain to the contractors could it have been disposed of on the way in without the knowledge of this office and before reaching the supervision of the parties for whom the work was being done. The contractor not only has to bear the expense of retowing it to sea, amounting to about $50 per scow, but frequently has to redredge it before being able to properly dispose of it.

In the course of performing their regular duties the vessels of the patrol fleet have, during the past year, frequently rendered valuable services in saving life and property. The letters of thanks received by this office have been filed in the records to the credit of the vessel rendering the assistance. A special noteworthy case was the prompt and gallant services rendered by the crew of the *Lamont* when the sloop *Roxana* capsized off Craven shoal on the afternoon of July 18, 1909. The *Roxana* had 21 persons on board, comprising men, women, and children. All were thrown into the sea. The *Lamont* made full speed for the scene and succeeded in rescuing 6 men and 4 women, all that were afloat on her arrival. Especially to be commended was the gallant conduct on the part of Thomas Ericson, deckhand of the *Lamont*, in having gone overboard and from a perilous position in the neighborhood of the *Lamont's* propeller diving for and rescuing a woman of this party. From the general testimony of those who witnessed this rescue there is no doubt that had it not been for the promptness and gallantry displayed by the crew of the *Lamont*, many, if not all, of those rescued would most certainly have been drowned.

That any material should be sent to sea and dumped off the mouth of the harbor is most regrettable in view of the great amount of partially submerged land capable of being easily transformed into valuable property lying in such close proximity to the city. It was hoped from the policy adopted by this office of extension seaward of the limits for dumping waste material and the consequent involving of so much longer and more extensive towage, to gradually compel the utilization of waste material for filling-in purposes, from an economical point of view. Although much has been accomplished in

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the direction indicated, private capitalists have not yet ventured to any great extent in the reclaiming of these many acres of land, although evidently it is a sound business investment. Yet the city is advancing along these lines, and it is particularly satisfactory to note the increasing utilization of the city refuse—that is, street sweepings—for filling-in purposes. Much of this class of material is being used in enlarging Rikers Island, while portions have been sent to Newark Bay, Staten Island Sound, and other near-by places for filling in behind bulkheads. It is only proper that the city authorities should lead in this direction and demonstrate that its street sweepings, ashes, and refuse can be profitably and expeditiously disposed of in some less objectionable manner than dumping at the mouth of the harbor. A large amount of material has also been utilized as filling by the Pennsylvania Railroad Company at Harrison, N. J. A small amount of selected material is similarly used at Governors Island, and much of the dredging spoils from the improvement of the Passaic River channels and vicinity is made use of by pumping on the swamp lands to the westward of Newark Bay.

No permits have been issued for the dumping of garbage at the mouth of the harbor during the past fiscal year. The entire garbage from the city is disposed of by cremation at Barren Island, 233,925 cubic yards being thus disposed of during the past year.

Material dredged from the Ambrose and other channels by the United States operating dredges under United States Army engineer officers is deposited under their supervision in an average depth of 80 feet in the neighborhood of Scotland light-ship or such other point near the mouth of the harbor as they may deem to the best interests of the United States. The quantity so deposited during the past year amounts to 9,706,394 cubic yards. This amount, added to that deposited by private contractors engaged in public work in improvement along the water fronts of Manhattan, Brooklyn, and New Jersey, tunnel excavations and débris from excavations, amounting to 9,547,460 cubic yards, gives an aggregate of approximately 19,250,854 cubic yards deposited during the year at the mouth of the harbor. The transportation of this large amount of waste material over the waters of the harbor to the point for final disposition involves a towage varying from 25 to 40 miles. The very nature of the material comprising the tows is a powerful incentive to get rid of it at as little cost as possible and emphasizes the necessity for the drastic measures as passed by Congress for the protection of the channels. Any modification of the existing laws by which owners or contractors may evade responsibility would be inimical to the best interests of the Government and the commercial interests of the port. Although stringent, it is not unjust, and is now so fully established by numerous trials and decisions of cases in the United States courts that the expenditures of the Government in its enforcement are reduced to the maintenance of a competent patrol system.

During the summer months a great deal of dredging is going on up the Hudson, Long Island Sound, in the kills and bays around Staten Island, and in many small inlets and creeks. This work is carried on to maintain channels to brickyards and ice houses, small manufactories, and other plants. Permits are issued for the final disposition

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of such dredging spoils either on shore above high-water mark, behind bulkheads, or at such points in the deep waters of the locality as may prove least injurious and may meet with the approval of the United States engineer officer in charge of the district. Any attempt by this office to keep careful watch over all these operations with the present force is futile. This office has but one launch (the *Lookout*) capable of operation in shoal water, and this boat has no sleeping accommodations for the man in charge.

The following is a synopsis of cases referred during the past fiscal year to the United States district attorneys for action, and of such cases settled or still pending since last annual report:

CASE AGAINST HAMBURG-AMERICAN LINE STEAMSHIP DEUTCHLAND.

A synopsis of this case appeared in the Annual Report of the Chief of Engineers for 1909, Appendix A A A, page 2289.

October 13, 1908: Indictment against Carl Kaempff, master of steamship *Deutschland*, filed.
June 30, 1909: Case pending.
January 24, 1910: Nolle prosequi entered. (C. 84.)

CASE AGAINST TUG FRANKLIN N. BROWN.

[Brown and Fleming Contracting Company, owners; John Erickson, master.]

A synopsis of this case appeared in the Annual Report of the Chief of Engineers for 1909, Appendix A A A, pages 2289 and 2290.

June 30, 1910: Case pending.

CASE AGAINST TUG BEE.

[R. G. Packard Company, owners; Frank Romard, master.]

A synopsis of this case appeared in the Annual Report of the Chief of Engineers for 1909, Appendix A A A, page 2291.

June 30, 1910: Case pending.

CASE AGAINST TUG M. MORAN.

[Alfred Walling, master; Louis Johnson, scowman; Moran Towing and Transportation Company, owners of tug; O'Brien Bros., owners of dumper.]

The tug *M. Moran*, with dumpers *Sea Bird* and *Sea King* loaded with cellar dirt in tow, passed out to sea on June 30, 1909. This tow was inspected by the inside patrol vessel while passing the fort bound out about 9.30 p. m. of that date, when both dumpers were found to be fully loaded with cellar dirt. The tow was again inspected by the patrol vessel *Scout* (R. Strauss, mate, on watch) at a point about 1½ miles east-southeast of the light-ship, still bound out, when the dumper *Sea King* was found to be entirely empty. It was therefore clear that the contents of this dumper had been illegally disposed of at some point in the channels of the harbor between the fort and point of last inspection.

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The papers in this case were therefore referred to the United States attorney for the southern district of New York, recommending action with a view to the prosecution of the parties liable.

January 15, 1910: Jury disagreed after remaining out four hours.
January 17, 1910: Supervisor recommends proceeding with a view to retrial.
January 31, 1910: Retrial set for February term of court.
February 14, 1910: Moran Towing and Transportation Company, Alfred Walling, O'Brien Brothers, and Louis Johnson pleaded guilty to indictment charging them with having unlawfully dumped scow *Sea King* on June 30, 1909, at a place other than that specified on the permit. The Moran Towing and Transportation Company was fined $250, which fine was immediately paid, sentence against other defendants being suspended. (C. 124.)

CASE AGAINST THE TUG COLONEL JOHN F. GAYNOR.

[Newark Meadows Improvement Company, owner; Joseph H. Wells, master; Guiseppi Fiojo, scowman.]

The tug *Colonel John F. Gaynor*, having in tow dumper *H. C. 5* fully loaded with mud, passed to sea on the afternoon of August 4, 1909; was kept under surveillance by the patrol boat *Nimrod* (George Campbell, master), and when at a point about one-fourth of a mile east-southeast of the inner south channel buoy, at about 2.15 p. m., the contents of two pockets were illegally dumped. The tow, however, proceeded to the dumping ground and legally discharged the contents of the remaining four pockets at about 3.15 p. m. of that date.

As this seemed a clear violation of law, being one of those cases in which poor judgment was shown by the master of the towing vessel in proceeding to sea with a fully loaded scow under the severe condition of weather then prevailing, and in view of the fact that the other tows in that tide did not venture below the Narrows, and further that when this tow was sighted by the patrol vessel the scow was being buried under heavy seas, jeopardizing both life and property, it was deemed of such grave importance as to warrant reference to the United States attorney for the southern district of New York with a recommendation that proceedings be instituted, with as little delay as practicable, with a view to the prosecution of the parties responsible.

October 19, 1909: This case was heard in the matter of the demurrer of the defendants to the indictment, in effect that the crime was committed within the territorial limits of the State of New Jersey, and therefore of the district of New Jersey, and from which it follows that this criminal prosecution must not be brought in New York, but before an impartial jury of the district wherein the crime was committed. In sustaining the demurrer Judge Hough says: "This conclusion does not lessen or interfere with the national jurisdiction in admiralty. Admiralty cases may be promoted where the *res* or respondent is found and seized or served. A remedy in admiralty might have been given for the offense of illegal dumping, but this proceeding has no relation to admiralty; it is strictly criminal, and the place where the crime was committed governs jurisdiction. This alleged crime was committed in New Jersey. Demurrer sustained."
October 20, 1909: In view of the importance of this case the papers, together with a copy of the decision of the circuit court of the United States for the southern district of New York, were forwarded to the United States attorney for the district of New Jersey for his consideration and, if advisable, a resubmission to the proper courts in accordance with that decision.
October 26, 1909: Complaint filed and warrants issued.
January 21, 1910: Indictment filed.
February 5, 1910: Notice to plead served.
February 21, 1910: Defendants pleaded not guilty.
May 31, 1910: Case tried. Verdict guilty.
June 6, 1910: Newark Meadows Improvement Company fined $250. Sentence suspended as to Wells and Fijio. (C. 126.)

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CASE AGAINST THE TUG M. MORAN.

[Moran Towing and Transportation Company, owner; Alfred Walling, master; Frank Pero, scow man; and John G. Mulligan, owner of dumper.]

The tug *M. Moran*, having in tow the dumper *Guiding Star* loaded with cellar dirt, passed to sea on the afternoon of August 13, 1909, and was inspected by the inside patrol vessel while passing Hoffman Island bound out at about 10.50 p. m. of that date, when the *Guiding Star* was found to be still fully loaded. This tow was again inspected at a point about 2 miles east-southeast of Scotland light-ship by the patrol vessel on outside duty (*Scout*, Master Charles Bell, Mate Rudolf Strauss), when it was found that 2 pockets were empty, the scow man stating that he had dumped these pockets at the light-ship while bound out as the scow was too heavily loaded. As this seemed a deliberate violation of law, the papers were referred for the action of the United States attorney for the southern district of New York with a recommendation that proceedings be instituted with a view to the prosecution of the parties liable.

February 10, 1910: Defendants pleaded guilty to indictment. The Moran Towing and Transportation Company was fined $250. Fine immediately paid, and sentence suspended against other defendants. (C. 128.)

CASES AGAINST TUGS COLONEL GAYNOR AND EUGENE HUGHES.

[Midland Land and Improvement Company and Newark Meadows Improvement Company.]

The checking system developing a suspicion that much of the material dredged from the Passaic River and Newark Bay, under government contract, was not being disposed of in accordance with law and contract, one of the deputy inspectors of this office, John J. O'Mara, was detailed to investigate the operation of the final disposition of material at Point no Point, under a plan approved by the department for material dredged in the improvement of the channels of the waters above stated. The result of his investigations were such as to corroborate the suspicion; in short, to fully substantiate the fact that much of the material dredged was not legally disposed of. The United States engineer officer under whom the work was being done was so advised, and special efforts were made to obtain sufficient evidence to warrant a reference of the cases for legal action. All the papers in the cases were forwarded to the United States attorney for the district of New Jersey with a recommendation that proceedings be instituted with as little delay as practicable, with a view to the successful prosecution of the parties liable.

June 15, 1910: District attorney of New Jersey advised this office, "that the proofs of the violation in the Passaic River and Newark Bay did not appear to be sufficient to warrant an indictment. The grand jury, to whose attention these cases were called, found no bill, and I see no reason why the matter should be further pressed." (C. 134.)

CASE AGAINST THE TUG JULIA C. MORAN.

[Moran Towing and Transportation Company, owner; A. Clancy, master.]

The tug *Julia C. Moran*, having in tow dumpers *No. 4 RR* and *No. 7 H* fully loaded with mud dredged from Arthur Kill, passed the fort bound out about 7.25 a. m. November 24, 1909. This tow was sighted by the outside patrol vessel *Cerberus* (master, Peter Nelson) at about 9.45 a. m. at a point about abeam Palestine shoal

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buoy, Swash channel, appearing to be unable to make any headway against the heavy sea and strong northeast wind, and turned as if to reenter the harbor, when the contents of two pockets of *No. 4 RR* and two pockets of *No. 7 H* were illegally discharged. Upon the tow's return to the Narrows an inspection was made of the dumpers, when it was found that *No. 4 RR* had 3 feet of water in her hold and *No. 7 H* had 1½ feet.

The United States Army engineer officer under whom the dredging of this material was being done for the Government was advised of the facts as above stated and proper deductions were made for the material not disposed of in accordance with the terms of contract. Also as this seemed a clear violation of law, due to poor judgment on the part of the towboat master in proceeding to sea under the severe conditions of weather then prevailing, the case was referred to the United States attorney for the district of New Jersey, with recommendation that proceedings be instituted with a view to the prosecution of the parties liable.

This case was presented to the grand jury at the January term, but no bill was found. (C. 141.)

CASE AGAINST THE TUG O. L. HALENBECK.

[Cahill Towing Line, owner; Maritime Dredging Company, owner of dumpers.]

In this case the tug *O. L. Halenbeck*, having in tow dumpers *No. 14 M. D.* and *No. 15 M. D.*, was inspected while passing the fort bound out about 10.15 a. m., December 10, 1909, when both dumpers were found to be fully loaded with mud. This tow was overhauled by the patrol vessel *Nimrod* (master, George Campbell), on outside duty, when near the West Bank light. Dumper *No. 14 M. D.* was then found to have one pocket empty and *No. 15 M. D.* was still fully loaded. While under observation *No. 15 M. D.* illegally dumped one pocket at Palestine shoal and one pocket at buoy No. 3 and the remaining three pockets between buoy 3 and inner fairway buoy in South channel, to prevent the scow from turning over. Upon investigation it was clearly shown that the material thus illegally discharged in the channels of the harbor was due to the employment of defective and unseaworthy vessels to transport it. The papers were referred to the United States attorney for the district of New Jersey, with recommendation that proceedings be instituted against the Maritime Dredging Company.

January 31, 1910: Obtained order for leave to file criminal information, and filed same against the Maritime Dredging Company. Notice to plead served, returnable February 21, 1910.
February 21, 1910: Plea, not guilty. Bail, $500.
May 11, 1910: Trial. Verdict, guilty.
May 31, 1910: Defendant fined $500.
June 6, 1910: Fine reduced to $250. (C. 135.)

CASE AGAINST THE TUG EDMUND MORAN.

[Moran Towing and Transportation Company, owner; Thomas Reynolds, master; International Contracting Company, owner of dumpers.]

The tug *Edmund Moran*, having in tow dumpers *Nos. 6 K* and *7 K*, was inspected while passing the fort bound out about 3.40 p. m. of April 16, 1910, when both dumpers were found to be fully loaded with mud.

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At about 6.10 p. m. this tow was sighted bound out through the Swash channel, making heavy weather, by the patrol vessel *Cerberus* (master, Peter Nelson) on outside duty, when the tow was about one-eighth of a mile below Romer light. It turned to reenter the harbor on account of the heavy weather. The scowman, Julius Andersen, on scow *6 K*, and Scowman Christian Petersen, on scow *7 K*, illegally discharged the contents of the middle pocket of each scow, claiming it was necessary to do so in order to save life and property.

As this tow started to sea in the face of weather conditions which showed extremely poor judgment on the part of the master in assuming such a hazardous trip, not only risking a violation of law in reference to the deposit of material but unnecessarily jeopardizing life and property, the papers were referred to the United States attorney for the district of New Jersey with recommendation that proceedings be instituted with a view to the prosecution of the parties liable.

June 28, 1910: Indictment found.
June 30, 1910: Case pending. (C. 149.)

CASE AGAINST TOMASSO RICI.

[Foreman, department of street cleaning, at city dump, foot of Stanton street, East River, New York City.]

During an inspection of the waters of the East River by the patrol boat *Vigilant* on the morning of June 22, 1910, much débris was encountered and traced to the dump of the city department of street cleaning, where, at 9.25 a. m., much floatable material was seen to get adrift, due evidently to the negligence of the city employees or carelessness of the trimmers. The foreman of trimmers was taken before United States Commissioner John H. Shields, who held him in bail for a hearing.

June 24, 1910: Hearing held, witnesses examined, and adjourned.
June 29, 1910: Hearing continued.
June 30, 1910: Defendant discharged with consent of the United States attorney.

The following is a list of cases of violation of the act of Congress approved May 28, 1908, in relation to equipment required to be carried by scows or other vessels employed in the transportation of waste, which have been referred to the United States district attorney for his action during the past year, showing disposition in each case:

Date case was referred.	Name or number of scow.	Owner's name.	Disposition.
December 1, 1909...	Queen.....	O'Brien Bros.....	Case transferred to eastern district of New York. Pending.
Do.....	Chatham.....	J. C. Rodgers.....	Defendants discharged upon complying with law.
December 2, 1909...	D. S. C. Nos. 1 and 45.	City of New York.	Do.

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During the fiscal year ending June 30, 1910, 27,535,295 cubic yards of material—mud, sand, city refuse, garbage, cellar dirt, ashes, lime, and other material—have been moved and deposited outside the harbor at properly designated places and behind bulkheads in the neighborhood of New York, as per the following recapitulation:

Place of deposit.	Kind of material.	Amount.
		Cubic yards.
Mouth of harbor, outside Scotland light-ship.	Mud, sand, city refuse, etc.	19,253,854
Long Island Sound	Mud, shells, etc.	1,858,736
Fishers Island Sound	do	5,691
Hudson River	Sand and mud	145,982
Do	Mud, dirt, ashes, etc., behind bulkheads and on shore for filling.	259,441
Harlem River	do	27,400
East River	do	2,368,546
Shrewsbury River	do	315,482
Passaic River	do	1,209,777
Raritan River	do	32,602
Hackensack River	do	10,800
Staten Island Sound	do	34,668
Newark Bay	do	542,710
New York Bay	do	923,423
New York Bay (Central R. R. Co. of New Jersey, Port Liberty).	do	312,258
Barren Island	Garbage, dead animals, etc., on shore for reduction	233,925
Total		27,535,295

Permits issued	9,259
Average number of tows daily to sea	20
Average number of scows daily to sea	40

From the foregoing statement it will be seen that 19,253,854 cubic yards of mud, street sweepings, cellar dirt, etc., were deposited near the mouth of the harbor; 1,858,736 cubic yards of dredging spoils deposited in Long Island Sound, a small percentage of which—principally sand and shells—was utilized for the propagation of oysters, being scattered over oyster beds under supervision of the shell fish commission of the State of Connecticut; 5,691 cubic yards of mud, etc., deposited in Fishers Island Sound; 6,037,107 cubic yards of cellar dirt, ashes, and other inoffensive material were used for filling in behind bulkheads; and 233,925 cubic yards of garbage, dead animals, offal, etc., were deposited on Barren Island for reduction.

The following is a statement of the appropriation for "Prevention of Deposits, Harbor of New York, 1910:"

For pay of inspectors, deputy inspectors, office force, and expenses of office		$10,260.00	
Expended to June 30, 1910	$10,127.30		
Outstanding liabilities	78.61		
		10,205.91	
			$54.09
For pay of crews and maintenance of 6 steam tugs and 1 launch		$75,000.00	
Expended to June 30, 1910	$67,638.36		
Outstanding liabilities	7,360.56		
		74,998.92	
			1.08
Balance			55.17

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The following is an estimate of appropriation required for service of the fiscal year ending June 30, 1812, by the supervisor of the harbor:

Detailed objects of expenditure and explanations.	Estimated amount that will be required for each object.	Amount appropriated for fiscal year ending June 30, 1911.
Prevention of obstructive and injurious deposits within the harbor and adjacent waters of New York City		
For pay of inspectors, deputy inspectors, office force, and expenses of office	$10,260	$10,260
For pay of crews and maintenance of 6 steam tugs and 1 launch	75,000	75,000
For renewing engines and boilers of steam tug Vigilant		15,000
For purchase or construction of one steam tug	50,000	
Total	135,260	100,260

Very respectfully,

C. McR. WINSLOW,
Captain, U. S. Navy, Supervisor.

The CHIEF OF ENGINEERS, U. S. ARMY.

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APPENDIX C C C.

ANNUAL REPORT OF THE CALIFORNIA DÉBRIS COMMISSION FOR THE FISCAL YEAR ENDING JUNE 30, 1910.

CALIFORNIA DÉBRIS COMMISSION,
San Francisco, Cal., June 30, 1910.

SIR: The California Débris Commission has the honor to submit the following annual report for the fiscal year ending June 30, 1910:

The conditions which led up to the creation of the commission were set forth in the Annual Report of the Chief of Engineers for 1905 (pt. 3, pp. 2585–2586).

The duties of the commission are fully set forth in the act of Congress creating it (act approved March 1, 1893).

The operations of the commission during the past fiscal year have been as follows:

REGULATION OF HYDRAULIC MINING.

During the year 14 applications were received for permits to mine by the hydraulic process under the requirements of the act of Congress approved March 1, 1893, as amended by the act approved February 27, 1907. During the same period 8 permits to mine by the hydraulic process were granted.

A number of permits were revoked by the commission during the year, the miners in such cases having abandoned operations or failed to maintain the impounding works, as specified by the commission. A number of licenses were also temporarily suspended for various causes. Numerous personal inspections of mines and their débris impounding works were made during the year in connection with the work of requiring operators to impound properly the débris resulting from their operations.

PLANS FOR IMPROVEMENT AND PROTECTION OF RIVERS AND CONTROL OF FLOOD WATERS AND MINE DÉBRIS.

Examinations were made of several sites for reservoirs for use in storing flood waters.

Several surveys were made along and in the vicinity of Sacramento and Feather rivers.

These examinations and surveys were made to comply with the provisions of the act of Congress approved March 1, 1893, requiring the commission to mature and adopt plans for the protection and improvement of the streams comprising the Sacramento and San Joaquin river systems for the purposes of navigation, for the control of flood waters, and for the control and disposition of mine débris.

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The problem of débris control in the Sacramento and San Joaquin river systems is inseparably connected with those of flood control and navigation. As the United States assumes the paramount control of the river for navigation purposes, any satisfactory solution of the whole problem should, in the opinion of the commission, be made under a project prepared and carried out by the War Department. Further, any plan for adequately developing the navigation must consider the floods, the water taken for irrigation, etc. The State of California and the owners of property injured by the floods will be the principal ones benefited by carrying out any plan for flood control, and should bear part of the cost. The United States and State of California have been for some years jointly interested in the problem of control of mining débris and have shared the cost, the work being done under the direction of the California Débris Commission. A similar plan would doubtless be satisfactory with reference to flood control, the relative amounts to be paid by the United States and the State of California to be determined in the plan.

Under the requirements of sections 4 and 5 of the act of Congress approved March 1, 1893, the commission during the past year has continued the preparation of a project for the complete control of the floods of the Sacramento River and its tributaries, and it was expected that the report on this project would be completed in time to be submitted with this report. The delays occasioned by the necessity of securing additional data have made it impracticable to complete this project before about July 30, 1910. Therefore report on the project will be submitted as a special report about that date.

Estimate of additional funds required.

Amount (estimated) required for expenses of California Débris Commission during the fiscal year ending June 30, 1912, in regulating hydraulic mining operations in the State of California, making examinations and surveys for improvement of navigation, control, and disposition of mine débris and control of flood waters, as required by the act of Congress approved March 1, 1893 ..... $15,000

STORAGE OF MINE DÉBRIS IN YUBA RIVER, CALIFORNIA.

The operations during the year under the existing project for impounding and storing mine débris in Yuba River were as follows:

Dredge embankments.—The work of constructing gravel embankments by means of gold dredges to confine and control the flow of Yuba River in the vicinity of Daguerre Point, under agreements with W. P. Hammon and associates, was continued during the year. This work involves the construction of about 16,700 linear feet of embankments, 300 feet wide on the base and 30 feet high at the highest places. About 14,600 feet of the total of 16,700 feet of these embankments have thus far been built, the work during the past fiscal year consisting of strengthening the completed embankment by additional parallel embankments. These embankments are being built for the United States and State of California in exchange for the right to extract gold from the gravel in the area south of the south training wall and west of the Daguerre Point barrier.

The work of constructing gravel embankments by means of gold dredges to confine and control the flow of Yuba River below Daguerre Point, under an agreement with John Martin (Marysville Gold

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Dredging Company, successor), was continued during the past year. These embankments are to be about 10,000 feet in length, 300 feet wide on the base, and 30 feet in height at the highest places. About 5,200 feet of these embankments has been completed, 800 feet of which was placed during the past year. These embankments are being constructed for the United States and State of California in exchange for the right to extract gold from the gravel on the lands west of the old state dam and south of the south training wall.

The work of constructing an embankment extending downstream near the north bank of the Yuba River from Daguerre Point, under a contract with Anson B. Munson, dated March 29, 1905, as modified by two supplemental contracts dated September 21, 1907, and November 6, 1907, was continued during the year and completed on July 31, 1909. This embankment, with a parallel dredge-built embankment 2,000 feet to the south, is intended to confine and direct the river at all stages. As completed, this embankment for a length of 8,600 feet had a height of 11 to 13 feet, a crest width of 10 feet, and side slopes of 1 to 2 and 1 to 3. For 3,400 feet it was a gold-dredge embankment of the following minimum dimensions: Height, 20 feet; crest width, 20 feet; base width, 150 feet.

On August 31, 1909, a contract was entered into with Yuba Consolidated Gold Fields, a corporation, for strengthening 5,200 feet of this wall with a gold-dredge embankment of the dimensions indicated above. About 4,290 feet of this wall had been completed at the end of the fiscal year.

Settling basin.—The work of constructing outlet for the settling basin on the south side of Yuba River in the vicinity of Daguerre Point, under contract entered into with J. A. Baumann & Co., of San Francisco, Cal., on December 10, 1908, was continued. All work under this contract was completed on September 30, 1909.

The quantities of materials furnished and placed by the contractors under this contract during the fiscal year were as follows:

Piles driven	linear feet	2,446.3
Concrete (1:2:4) furnished and placed	cubic yards	374.33
Concrete (1:2½:5) furnished and placed	do	1,095.84
Steel reenforcing bars furnished and placed	pounds	41,536.4
Cobblestone pavement furnished and placed	square yards	364.2

The head gates of the settling basin were raised 4 feet during the past year and the embankment at that point strengthened.

The Linda levee north of the old state dam was raised to elevation 124 by the Yuba Consolidated Gold Fields. This work was done without cost to the United States under the terms of a deed from James O'Brien to the United States dated December 6, 1901.

The dredge embankment on the south side of the settling basin was completed by the Marysville Dredging Company. This embankment is about 5,200 feet in length and is a part of the embankment being constructed by that company, without cost to the United States, in exchange for the right to extract gold on lands west of the old state dam and south of the south training wall.

Approximately 6,600 cubic yards of earth was placed by hired labor during the past year in revetting the inside slope of the dredge embankment.

Approximately 6,500 cubic yards of earth was placed during the year in raising the Linda levee west of the old state dam.

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The following is a summary of the expenditures during the past fiscal year:

Dredge embankments	$37,164.54	
Settling basin	26,592.62	
Engineering and superintendence	2,580.44	
		$66,337.60
Deduct one-half paid by State of California		33,168.80
Balance paid by the United States		33,168.80

The commission is of the opinion that the existing project for the treatment of Yuba River is a worthy one to the extent of storing mine débris in that stream by means of the training walls thus far built and remaining to be built under the project, and of storing material above the Daguerre Point barrier by that barrier, completed and strengthened.

APPROPRIATIONS BY CONGRESS.

June 3, 1896	$250,000.00
June 13, 1902	150,000.00
Received from sales	716.34
Total	400,716.34

GENERAL PROJECT FOR CONTROL OF DÉBRIS AND FLOODS IN THE SACRAMENTO AND FEATHER RIVERS.

The act of Congress approved June 25, 1910, contained the following provision:

Improving Sacramento and Feather rivers, California: Continuing improvement and toward the controlling of débris and floods, in accordance with the recommendations of the California Débris Commission in its report dated June thirtieth, nineteen hundred and seven (printed in the Annual Report of the Chief of Engineers, United States Army, for nineteen hundred and seven, pages twenty-two hundred and sixty-two to twenty-two hundred and sixty-nine, inclusive), four hundred thousand dollars: *Provided*, That no part of this sum shall be expended unless the State of California shall appropriate for the prosecution of said project a like sum of four hundred thousand dollars and deposit the same in the Treasury of the United States: *Provided further*, That the Treasurer of the United States is hereby authorized to receive from the State of California any and all sums of money that have been or may hereafter be appropriated by said State for the purpose herein set forth; and when so received the said sums are hereby appropriated for said purpose to be expended under the direction of the Secretary of War and the supervision of the Chief of Engineers: *And provided further*, That the work herein provided for shall not be begun until all rights of way needed for levees and spoil banks have been furnished the United States free of cost.

As stated in the Annual Report for 1909 (Pt. 1, p. 906), the State of California on March 1, 1909, appropriated $400,000 for this purpose. The total sum of $800,000 for dredging referred to in the commission's special report of June 30, 1907, has therefore been provided, with the stipulation on the part of Congress, however, that the work shall not be begun until all rights of way needed for levees and spoil banks have been furnished the United States free of cost.

The Sacramento and San Joaquin River Improvement Association has been organized to acquire the necessary rights of way and furnish the same to the United States free of cost, and the work of this association is progressing favorably.

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The commission is of the opinion that the general project for the control of débris and floods by means of dredging is a worthy one.

APPROPRIATION BY CONGRESS.

June 25, 1910..... $400,000.00

Respectfully submitted.

JOHN BIDDLE,
Lieutenant-Colonel, Corps of Engineers.
THOS. H. JACKSON,
Captain, Corps of Engineers.
CHAS. T. LEEDS,
First Lieutenant, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

ABSTRACTS OF CONTRACTS IN FORCE DURING FISCAL YEAR ENDING JUNE 30, 1910.

Name of contractor, Anson B. Munson; contract approved April 12, 1905; work to be begun on or before June 16, 1905, and to be completed on or before June 18, 1906. (Time for completion afterwards extended.) The contract provided that the contractor should construct 200,000 yards of embankment fill at 12.4 cents per cubic yard. Contractor placed 191,317 cubic yards when, in March, 1907, it was found necessary, on account of damage caused by floods, to replace portions of the embankment and strengthen other portions. Accordingly supplemental agreements were entered into with the contractor on September 21, 1907, and November 6, 1907, which required the contractor to furnish and place 140,000 cubic yards of embankment at 25 cents per cubic yard and 60,000 square yards of brush protection at 15 cents per square yard. The two supplemental agreements were approved on October 15, 1907, and December 5, 1907, respectively. They required work to be begun by January 14, 1908, and to be completed by November 30, 1909..

Name of contractor, J. A. Baumann & Co.; emergency contract entered into December 10, 1908; work to be begun by January 1, 1909, and to be completed by April 1, 1909. (Time for completion extended.) The contract provided that the contractor should excavate 8,250 yards of earth at 40 cents per cubic yard, drive 1,960 feet of piles at 20 cents per linear foot, furnish and place 825 yards of concrete at $8.26 per cubic yard, furnish and place 2,890 yards of concrete at $7.35 per cubic yard, furnish and place 80,735 pounds of steel reenforcing bars at 4.1 cents per pound, and furnish and lay 3,057 square yards of cobblestone pavement at 56 cents per square yard.

Name of contractor, Yuba Consolidated Gold Fields; contract entered into August 31, 1909; work to be completed by December 31, 1910. The contract provides that the contractor shall strengthen approximately 5,200 linear feet of the north training wall below Daguerre Point Cut, Yuba River, California, for the sum of $45,000.

Abstract of leases in force during fiscal year ending June 30, 1910.

Name of lessor.	Date of lease.	Date lease became effective.	Date lease expires.	For use of—	Compensation per month.
Western Real Estate Co.	Sept. 26, 1908	Nov. 1, 1908	Oct. 31, 1909	Office rooms, San Francisco.	$100.00
S. P. Pankost	May 26, 1909	June 1, 1909	Nov. 30, 1909	House boat	8.00
Wm. A. Van Zee	....do	....do	....do	....do	20.00
Casper Amocker	June 3, 1909	June 4, 1909	Nov. 4, 1909	....do	75.00
Patrick Mullholland	June 5, 1909	June 5, 1909	Nov. 5, 1909	....do	10.00
Western Real Estate Co.	Oct. 15, 1909	Nov. 1, 1909	Oct. 31, 1910	Office rooms, San Francisco.	100.00
Do	Dec. 31, 1909	Jan. 1, 1910	....do	Office room, San Francisco.	25.00

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APPENDIX D D D.

AQUEDUCT BRIDGE, DISTRICT OF COLUMBIA.

REPORT OF CAPT. WARREN T. HANNUM, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1910.

UNITED STATES ENGINEER OFFICE,
Washington, D. C., June 30, 1910.

SIR: I have the honor to forward herewith annual report for the fiscal year ending June 30, 1910, for the Aqueduct Bridge, District of Columbia. Maj. Jay J. Morrow, Corps of Engineers, was in charge until March 15, 1910, and Capt. Warren T. Hannum, Corps of Engineers, since the latter date to the end of the fiscal year.

Very respectfully,

WARREN T. HANNUM,
Captain, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

D D D 1.

REPAIR OF THE AQUEDUCT BRIDGE ACROSS THE POTOMAC RIVER AT WASHINGTON, DISTRICT OF COLUMBIA.

WORK OF THE FISCAL YEAR ENDED JUNE 30, 1910.

(A) REPAIRS TO OLD PIERS.

An examination of the old piers below the water line was commenced April 13, with a diver and outfit, hired by the day. As there had been no unusual freshet or other current disturbance since the last repairs were made, in the fall of 1908, it was expected that the masonry would be found in fairly good condition. This proved to be correct in the case of the five remaining old piers and the south abutment, but at the north abutment a cavity was found at the upstream corner, approximately 4 by 6 feet on the face and extending about 3 feet into the abutment, at a depth of about 10 feet below the water line. Extending downstream from this cavity for about two-thirds the length of the face, the joints were widely open from the erosion of mortar and the consequent dropping out of small stones.

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This abutment, as well as the southern one, had been reported in all previous examinations as in fair condition and not in need of repairs.

A few small cavities were found in piers 2, 3, 6, and 8, and the joints in all were found to be more or less open.

The repairs were made by the same method which has been practiced since the first repairs were made in 1889; that is, by filling the cavities found with concrete, mixed on a scow and placed in burlap bags, which were lowered to a diver, who placed them in position. The open joints which appeared dangerous, but were not wide enough to admit the bags of concrete, were protected as well as possible against further erosion by building up in front of the defective portions facings of concrete in bags.

Altogether about 29 cubic yards of concrete were placed at a total cost of $764.72, including superintendence, or an average of $26.37 per cubic yard. The amount used at each pier was as follows:

	Cubic yards.
Pier No. 2	3.2
Pier No. 3	4.2
Pier No. 6	4.3
Pier No. 8	3.4
North abutment	13.9
Total	29.0

No repairs were required at the south abutment or at pier No. 7.

The piers were placed in as good condition as is practicable with this method of repair, which is believed to be the most effective treatment possible with the funds available.

It is at best but patchwork, however, and while tending to prolong the life of the masonry to a certain extent, is not effective in arresting permanently the process of dissolution. That this deterioration is progressive is shown by the fact that new defects are discovered at each examination which did not exist at the time of previous examinations.

As the occurrence of these cavities can not be anticipated and provided against by the present method of patching, it is believed that in time the masonry in all of the old piers will deteriorate to such an extent that repair by any method will be impracticable unless the present method be abandoned in favor of a more certain and permanent one or the piers entirely rebuilt.

There are three possible ways of remedying present conditions:

A. By replacing the present bridge by an entire new one, preferably with fewer piers and longer spans.

B. By replacing the five old piers by new ones, as has already been done with piers 1, 4, and 5.

C. By providing some means of making each of the old piers as solid a mass of masonry as possible to prevent further deterioration in the exterior surface.

Plan A was considered by Congress in 1902, but was not adopted. An approximate estimate upon which the bill introduced was based was submitted by this office, giving the probable cost of a new bridge as $860,000 to $940,000, according to widths of roadway and sidewalks adopted. (See Report No. 1655, 57th Cong., 1st sess., on S. 5964.) While the amount required would depend also on the type of

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bridge selected, it is believed that a suitable structure could be built at a cost not to exceed $950,000, including removal of the present structure.

Plan B would provide permanent and reliable supports of uniform appearance for the present superstructure, but would not provide for any improvement in this. So far as is known at present the south abutment is in a safe condition. It is believed that the north abutment can be made reasonably secure by thoroughly riprapping in front of it. This treatment is prohibited in the case of the piers on account of the reduction in the cross section of the river which would result from the use of a sufficient amount of riprap to protect them effectively. It is thought that the removal of the five old piers, which are larger at the base than the new ones would be and which are now partially protected by riprap, which would also be removed, would increase the cross section of the river sufficiently to make the placing of additional riprap at the abutments permissible. The estimated cost under this plan is $350,000.

Under plan C it is proposed to surround each of the old piers with a jacket or shell of reenforced concrete up to or a little above the water line, after thoroughly cleaning out and grouting such open joints of the interior as are accessible, the work to be done within a cofferdam, which could be used with comparatively slight alterations at each pier, successively. While the exact condition of the interior of the piers can not be ascertained by a diver's examination, it is believed that the principal defects are in the face masonry, and that if this be properly repaired and confined against movement there will be no further deterioration. While the concrete jackets would increase slightly the obstructions due to the piers themselves, the removal of the riprap, which would no longer be needed, from around them would more than compensate for this. The estimated cost under this plan is $150,000, which would provide also for any repairs that may be found necessary at the abutments.

A more detailed description of the bridge and of repairs which have been made, may be found in the letter[a] to the Chief of Engineers, June 11, 1910, and previous annual reports.

During the year, tentative plans for a cofferdam, such as would be required under plan C above, were prepared and soundings and probings were made around all the old piers to determine as accurately as possible the present conditions.

[a] Not printed.

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APPENDIX EEE.

WASHINGTON AQUEDUCT, DISTRICT OF COLUMBIA, AND WASHINGTON AQUEDUCT, DISTRICT OF COLUMBIA, FILTRATION PLANT.

REPORT OF CAPT. WARREN T. HANNUM, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1910.

UNITED STATES ENGINEER OFFICE,
Washington, D. C., July 20, 1910.

SIR: I have the honor to forward herewith annual reports for the fiscal year ended June 30, 1910, for Washington Aqueduct, District of Columbia, and Washington Aqueduct, District of Columbia, Filtration Plant, in charge of Maj. Jay J. Morrow, Corps of Engineers, until March 15, 1910, and in my charge since that date.

Very respectfully,

WARREN T. HANNUM,
Captain, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

EEE 1.

Operations were carried on during the fiscal year under the following appropriations:

Maintenance and operation of the Washington Aqueduct and its accessories, act of Congress approved March 3, 1909.

Maintenance and operation of the Washington Aqueduct (District of Columbia) Filtration Plant, General, act of Congress approved March 3, 1909.

WASHINGTON AQUEDUCT.

MAINTENANCE AND OPERATION.

The following operations were conducted during the fiscal year under the appropriation made for the maintenance and repair of the Washington Aqueduct and those parts of the water-supply system of the District of Columbia that are under the supervision of the Chief of Engineers:

GATEHOUSES, BUILDINGS, AND GROUNDS.

At Great Falls the interior and the roof of the gatehouse and the derricks for handling the stop planks were painted, and the roof of the overseer's house was repaired.

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At Dalecarlia reservoir the concrete foundation of the boathouse was repaired; the boundary stones upon the No. 2 wasteweir strip, at the intersection of this strip with the boundary line on the west side of the Conduit road, were reset; 5 acres of ground were seeded in grass; 975 linear feet of California privet hedge was set out along the Conduit road and at the south connection, and 237 cedar and other trees were planted on the slopes of the reservoir and on the east side of the railroad; 600 cubic yards of fill were placed in Spring Branch; a wire fence was strung along the boundary line of the property on the east side of the Conduit road, and the date of the completion of the aqueduct was inserted upon the sluice tower in the blank space left for that purpose in the original inscription.

At Georgetown reservoir four boundary stones were reset at waste weir No. 3; the iron fence posts around part of the reservoir and the derricks for handling the stop planks were painted; the overseer's house was connected with the sewer in Conduit road; 312 reinforced concrete fence posts were constructed, each post being 6 feet 6 inches long, 6 inches square at the base, and tapering to 4 inches square at the top, at an average cost of 35 cents for labor and materials; 292 of these posts were set. Plans were made and work commenced upon a concrete panel and post fence with iron pickets to extend along the Conduit road in front of the reservoir.

At McMillan Park reservoir some grading was done at the east side of the reservoir; 936 shrubs were set out on the slope near the east shaft gatehouse, as well as 200 rose bushes on the south slope of the reservoir within the fence.

The records and maps at the 2728 Pennsylvania avenue office building were removed to the office of the filtration plant at McMillan Park and the interior of the building was prepared for occupancy by a caretaker.

All buildings, grounds, fences, and telephone line belonging to the Washington Aqueduct were kept in good condition.

DALECARLIA RESERVOIR.

A small amount of dredging was done at the north connection, completing the project for dredging in this reservoir, after which the dredge and equipment, including pontons, land pipe, etc., were prepared to remain idle.

The retaining banks for dredged materials were graded down to conform to the slope of the reservoir paving. A wagon road, including a small reinforced concrete bridge, was constructed between the north connection and the Conduit road. This bridge is 10 feet wide and consists of three 15-foot spans, and was built at a cost of $256.66 for labor and materials.

The south connection was strengthened in the same manner as the north connection during the previous fiscal year. The necessity for this work was explained on pages 2306 and 2307, Annual Report of the Chief of Engineers for 1909.

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The amount of work done and its cost were as follows:

	Labor.	Material.
Excavation, mud, and loose rock, 500 cubic yards	$210.57	
Forming lumber in cofferdam		$20.32
Concrete in walls and paving, 190 cubic yards	301.27	297.50
Backfilling	45.88	
Labor	557.72	
Material		317.82
Total	875.54	

The reservoir was out of service for sixty-two days during the year on account of dredging and the work at the south connection.

GEORGETOWN RESERVOIR.

The weir between the two basins was lowered to elevation 133.83; new stop plank timbers were made for waste weir No. 3, and the gauge boards in the reservoir were painted and reset; float gauges were made and installed at the influent and effluent gatehouses, and concrete steps were constructed at the outlet of the reservoir for convenience in taking samples of water.

M'MILLAN PARK RESERVOIR.

The smokestack at the east shaft pumping station was painted and the roads and grounds around the reservoir were kept in good condition.

THE CONDUIT.

During the year the feeder between the dam and gatehouse at Great Falls was cleaned out once, at which time about 65 cubic yards of deposit was removed. During the month of February a large amount of slush ice had to be removed from the intake, as it clogged the gates and shut off the water supply to the city for eighteen hours. A new 12 by 12 inch Georgia pine sill was placed at the bottom of the stop plank grooves at the intake. This undertaking proved rather troublesome and expensive on account of the difficulty encountered in constructing a cofferdam. The cost of this work was $57.64.

Mud deposited from the conduit upon opening waste weir No. 1 was removed from the Chesapeake and Ohio Canal in front of the waste weir. Several small cracks in the conduit near manhole No. 29 were pointed up with Portland-cement mortar, and an attempt was made to treat others, where the conduit lining joins the unlined section at Carderock Tunnel in the same manner, but with only partial success. The search for these leaks will be continued. A check gate was installed in the conduit near the north connection at Dalecarlia reservoir to prevent the water from Dalecarlia reservoir flowing backward in case of a break in the conduit above this reservoir. This was done at a cost of $69.68.

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A sluice gate, with operating stand and house, was installed at waste weir No. 2. The items of work done and their cost are as follows:

Survey, plans, and estimates	$88.66
6 by 4 foot rectangular sluice gate, rising-stem type, with 3-inch steel shaft	525.00
Sinking 6-inch shaft 33 feet 8 inches, by means of a steam well drill, through seamy rock, including lining of shaft	312.66
Constructing concrete backing for valve, 6½ cubic yards	47.66
Installing valve and operating stand	57.90
Constructing concrete house for operating stand	240.55
Total	1,272.43

The work of plastering the upper sectional third of the conduit at Cabin John Bridge with Portland-cement mortar to stop leakage was continued for a distance of 436 feet during the year, making the total distance completed 570 feet, completing this work. The leakage was reduced, especially at the middle of the bridge. A number of cracks were likewise pointed up in the conduit near manhole No. 20.

A discussion regarding the condition and capacity of the conduit may be found on pages 2308–2311, Annual Report of the Chief of Engineers for 1909.

THE CONDUIT ROAD.

Minor repairs were made to the section of the Conduit road between the Angler's Club House and Great Falls, and the various culverts and ditches along the entire length of the road were kept clean.

The grade of the road on the north side of Brooke's Hill, above the north connection of Dalecarlia reservoir, was reduced from a maximum of 12.6 to 6 per cent, requiring the removal and placing in fill of approximately 2,500 cubic yards of earth and stone. After grading, this section of the road was resurfaced with the macadam previously removed. A total distance of 1,085 linear feet was covered by this work at a cost of $1,574.52.

The grade of the road on Dalecarlia Hill in the vicinity of the spillway at Dalecarlia reservoir was likewise reduced from a maximum of 11 to 6 per cent, requiring the excavation and placing in fill of approximately 2,800 cubic yards of earth and stone. This work was done at a cost of $828.56.

The Conduit road was patrolled daily by a special officer, in the employ of this office, from the District line to Great Falls.

The telephone line, owned by this office, was removed between Thirty-fifth and T streets and Dalecarlia reservoir, arrangement having been made with the Chesapeake and Potomac Telephone Company to provide service over their lines to Georgetown and Dalecarlia reservoirs at government rates. The Aqueduct line from Dalecarlia reservoir to Great Falls continues in use.

THE TUNNEL.

The Washington City tunnel of the Aqueduct was partially drained and inspected on the 13th of April. Through this tunnel the water for the city flows from Georgetown reservoir to the McMillan Park reservoir in a direct line for a distance of nearly 4 miles.

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A map opposite page 2336, Annual Report of the Chief of Engineers for 1884, shows the location and longitudinal section of the tunnel.

A report of this inspection was submitted with the monthly report of the officer in charge for April, 1910. That portion of the tunnel between the west shaft and a point 1,300 feet east of the Widow's Mite air shaft, near Connecticut avenue, was inspected by the officer in charge and the superintendents of the filtration plant and aqueduct and was found to be in satisfactory condition. It was not possible to inspect the remainder of the tunnel on account of the failure of the air lifts to discharge the water rapidly enough to empty the tunnel before it was necessary to restore the flow of water to the McMillan Park reservoir to prevent an interruption of the supply of filtered water to the city. Obstructions in the piping of the air lifts are believed to have been the cause of the slow discharge by the air lifts, and an effort will be made to overcome the defects when conditions are again favorable in November, 1910.

About 12 cubic yards of cement mortar plaster, which had scaled off the rubble masonry side walls of the tunnel, were removed by laborers on the 13th of April from the section between the west shaft at Georgetown and Rock Creek. Several small piles of plaster remain in a portion of the tunnel inspected, but do not noticeably affect the flow of water.

THE BRIDGES.

Minor repairs were made during the year to the flooring on bridge No. 6 across Rock Creek and material was purchased during June, 1910, for renewing the wooden flooring.

THE MAINS.

Prior to August, 1905, the mains leading from the distributing reservoir were used for a gravity supply to the city. On August 21, 1905, the gates at the distributing reservoir were closed, and since that date the entire supply has passed through the tunnel to the McMillan Park reservoir. The mains are now more than ever an integral part of the city distributing system.

By mutual agreement they are now operated and maintained by the city water department. It is again recommended that their formal transfer to the city be authorized.

TURBIDITIES.

The practice of closing the inlet gates at Great Falls whenever the turbidity of the Potomac water reaches 500 or more, as described in the Annual Report of the Chief of Engineers for 1906, pages 2090 and 2091, was continued during the fiscal year, with the results shown in the following table, which are of course only approximate.

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TABLE No. 1.—*Table showing tons of suspended matter entering system, etc.*

	Amount that would have entered the system if the gates had been left continuously open.	Number of hours gates were closed.	Amount shut out.	Amount deposited in Dalecarlia reservoir.	Amount deposited in Georgetown reservoir.	Amount deposited in McMillan Park reservoir.	Amount entering filtration plant.	Total.
July	318	32.0	3	0	125	74	116	318
August	146	47.0	1	0	78	38	29	146
September	97	57.0	7	21	13	38	18	97
October	61	90.5	8	7	9	25	12	61
November	50	60.0	4	13	5	17	11	50
December	370	99.0	126	108	33	59	44	370
January	2,410	136.0	1,109	1,020	67	117	97	2,410
February	839	117.5	481	126	56	75	101	839
March	208	7.5	13	43	15	13	124	208
April	321	65.0	17	195	43	43	23	321
May	197	84.5	58	54	22	24	39	197
June	1,505	124.0	786	535	49	88	47	1,505
Total	6,522	920.0	2,613	2,122	515	611	661	6,522

From the above it is seen that the gates were closed 10.50 per cent of the time, thereby excluding 40.06 per cent of the total suspended matter that would otherwise have entered the system.

CONSUMPTION AND WASTE OF WATER.

Tables showing the average consumption of water per twenty-four hours, by years from 1874 to 1906, and by months from July, 1899, to June, 1906, will be found in the Annual Report of the Chief of Engineers for 1906, page 2092. The following table covers the fiscal years 1903 to 1910, and the accompanying diagram gives a graphic comparison with the consumption for previous years since 1899:

TABLE No. 2.—*Table showing average consumption of water for twenty-four hours.*

[In millions of gallons.]

	Fiscal years.							
	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.
July	59.80	61.50	63.20	69.80	69.18	68.64	71.08	64.05
August	59.00	59.70	67.70	71.40	68.03	67.74	68.14	61.42
September	56.50	61.10	67.90	71.30	69.82	68.93	65.83	60.32
October	58.70	59.10	63.90	68.40	69.14	66.46	65.89	59.18
November	54.70	58.60	62.10	66.10	65.51	61.54	60.06	55.25
December	60.70	60.10	70.30	67.20	65.71	62.29	57.99	56.77
January	60.10	65.30	75.10	65.30	67.62	63.36	57.72	62.49
February	59.30	67.80	86.00	68.70	74.68	68.17	55.42	60.28
March	55.30	60.00	67.60	64.30	64.23	59.63	55.31	56.04
April	55.10	57.20	63.10	62.70	63.45	61.51	58.19	58.32
May	57.70	60.80	66.30	65.60	62.47	62.96	59.25	57.76
June	59.50	62.30	70.60	67.80	63.53	67.96	60.12	58.37
Average	58.03	61.10	68.70	67.40	66.90	64.91	61.47	59.19

Population, United States census, 1910, 331,069. Per capita consumption based on police census for 1909, viz, 343,003.

Average per capita consumption, fiscal year 1910, 173 gallons; 1909, 179 gallons; 1908, 192 gallons; and 1907, 203 gallons.

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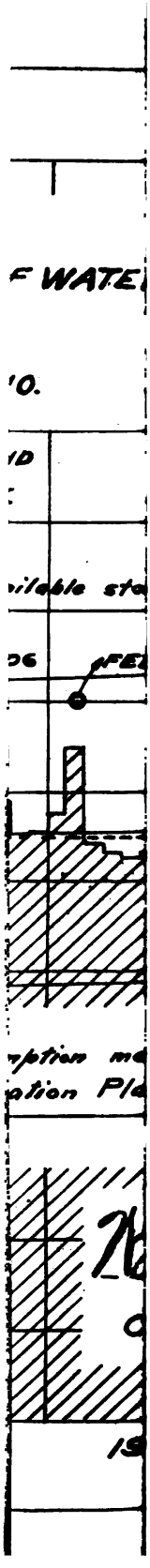

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The maximum daily amount of water pumped to the filters during the year was 78.50 million gallons.

The consumption of water for each month between January, 1903, and October, 1905, has been computed from a table prepared by Captain Hannum, showing discharges through the conduit for different losses of head between Dalecarlia reservoir and Georgetown reservoir, based on investigations made by Mr. F. F. Longley, as printed in House of Representatives Document 347, Sixty-first Congress, second session, "Increasing water supply, District of Columbia." The necessary corrections were applied to the discharges given in this table for corresponding losses of head in order to obtain the actual consumption of water. As the consumption computed by this means for a number of weekly periods, since the measurement of water by meters at the filtration plant was established, do not in general vary more than 2 per cent from the meter measurements, it is believed that the consumptions recorded above are the most accurate yet obtained and are therefore substituted for figures given in previous annual reports.

DIAGRAM SHOWING CONSUMPTION OF WATER.

Appropriations for the Washington Aqueduct, dates of acts, and reversions to the Treasury.

APPROPRIATIONS 1850–1900, INCLUSIVE.

September 30, 1850	$500.00
August 31, 1852	5,000.00
March 3, 1853	100,000.00
March 3, 1855	250,000.00
August 18, 1856	250,000.00
March 3, 1857	1,000,000.00
June 12, 1858	800,000.00
June 25, 1860	500,000.00
July 4, 1864	150,000.00
July 28, 1866	142,584.00
December 20, 1866	12,000.00
March 2, 1867	20,000.00
July 20, 1868	10,000.00
July 25, 1868	52,500.00
March 3, 1869	25,000.00
July 15, 1870	120,822.00
March 3, 1871	114,196.00
June 10, 1872	70,555.00
January 23, 1873	14,000.00
March 3, 1873	43,600.00
June 23, 1874	36,400.00
March 3, 1875	26,000.00
July 31, 1876	22,000.00
March 3, 1877	15,000.00
June 20, 1878	15,000.00
July 1, 1879	20,000.00
June 4, 1880	20,000.00
March 3, 1881	20,000.00
July 1, 1882	20,000.00
July 15, 1882	1,485,279.30
March 3, 1883	20,000.00
July 5, 1884	20,000.00
July 7, 1884	87,500.00
February 25, 1885	87,500.00
March 3, 1885	$20,000.00
March 26, 1886	5,000.00
July 9, 1886	20,000.00
August 4, 1886	555,000.00
March 3, 1887	20,000.00
March 30, 1888	355,000.00
July 18, 1888	20,000.00
March 2, 1889	595,000.00
August 6, 1890	25,500.00
September 30, 1890	48,396.78
March 3, 1891	20,000.00
July 14, 1892	20,000.00
March 3, 1893	80,000.00
August 7, 1894	82,500.00
August 18, 1894	4,000.00
March 2, 1895	71,500.00
June 11, 1896	25,000.00
March 3, 1897	26,000.00
June 30, 1898	322,210.50
March 3, 1899	230,000.00
June 6, 1900	176,034.34
Total	8,296,577.92
Received from sale of land, etc., prior to 1880; reverted to appropriation	15,651.39
	8,312,229.31
Reverted to Treasury	38,048.27
Net amount expended	8,274,181.04

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APPROPRIATIONS 1901–1910, INCLUSIVE.

March 1, 1901		$184,222.97
July 1, 1902		102,490.00
March 3, 1903		33,000.00
April 27, 1904		33,000.00
March 3, 1905		33,000.00
June 27, 1906		33,000.00
March 2, 1907		102,000.00
May 26, 1908		43,000.00
May 26, 1908		[a] 6,000.00
March 3, 1909		33,000.00
Total		602,712.97
Reverted to Treasury	$12,057.65	
Outstanding liabilities, June 30, 1910	4,366.65	
		16,424.30
Net amount expended, 1901–1910		586,288.67
Net amount expended, 1850–1900		8,274,181.04
Total net expended		8,860,469.71
(a) For construction		7,784,824.44
For operation, maintenance, and repairs		1,075,645.27
(b) Paid by United States		6,335,387.14
Paid by District of Columbia		2,525,082.57

E E E 2.

WASHINGTON AQUEDUCT, DISTRICT OF COLUMBIA, FILTRATION PLANT.

MAINTENANCE AND OPERATION.

A general description of the filtration plant was given in Appendix D D D 2, pages 2101 to 2103, of the Annual Report of the Chief of Engineers for 1906.

Turbidities.—The maximum, minimum, and average turbidities of the samples of water tested during the year are shown in the following table:

[a] Reappropriated from unexpended balance of appropriation for $90,000, act of Congress, March 2, 1907. Expended under Washington Aqueduct for parking grounds, McMillan Park reservoir.

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TABLE No. 1.—*Turbidities.*

[United States Geological Survey standard.]

(A) MAXIMUM.

	Great Falls.	Dalecarlia reservoir outlet.	Georgetown reservoir outlet.	McMillan Park reservoir outlet.	Filtered water reservoir.
1909.					
July	400	(a)	215	120	2
August	180	(a)	50	18	0+
September	26	24	(b)	25	0+
October	14	15	11	8	0+
November	11	11	10	6	0
December	600	110	80	50	3
1910.					
January	2,100	200	150	115	5
February	1,800	150	120	100	7
March	210	100	95	100	9
April	350	100	55	25	1
May	300	55	50	28	1
June	1,500	180	110	50	1
Fiscal years—					
1906–7	1,530	250	150	250	13
1907–8	3,000	340	250	160	20
1908–9	1,500	200	170	85	8
1909–10	2,100	200	215	120	9

(B) MINIMUM.

1909.					
July	7	(a)	9	6	0+
August	7	(a)	9	6	0
September	10	10	(b)	3	0
October	7	7	8	3	9
November	7	7	8	3	0
December	7	7	7	2	0
1910.					
January	13	10	11	8	1
February	15	13	13	12	2
March	9	11	14	10	1
April	7	7	7	3	0
May	11	9	8	5	0+
June	16	11	10	6	0
Fiscal years—					
1906–7	9	7	8	6	0+
1907–8	7	7	8	6	0
1908–9	7	7	6	5	0
1909–10	7	7	7	2	0

(C) AVERAGES.

1909.					
July	48	(a)	46	35	1
August	23	(a)	17	9	0
September	16	14	(b)	6	0
October	10	10	9	4	0
November	9	8	8	4	0
December	63	31	28	15	0+
1910.					
January	357	58	53	30	2
February	143	55	50	36	4
March	36	35	38	43	5
April	55	25	18	8	0+
May	33	19	17	13	0+
June	246	42	37	16	0+
Fiscal years—					
1906–7	114	46	37	29	2
1907–8	117	53	45	31	2
1908–9	79	50	32	22	1
1909–10	86	30	29	18	1

[a] Reservoir out of service on account of constructing retaining walls and buttresses at the south connection.

[b] Reservoir out of service on account of lowering weir between basins.

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Bacteria.—Daily analyses have been made of samples of water taken at Dalecarlia reservoir inlet (which are believed to represent fairly the river water at Great Falls), at the outlet of this reservoir, at Georgetown reservoir outlet, at McMillan Park reservoir outlet, in the filtered-water reservoir, and from each of the filters in operation. Samples from taps in various parts of the city are taken and tested once each week. All samples are tested by standard methods and the number of bacteria per cubic centimeter in each determined. In addition to this work many tests are made for the colon bacillus.

The results of this work are summarized in the following table:

TABLE No. 2.—*Bacteria per cubic centimeter.*

(A) MAXIMUM.

	Dalecarlia reservoir inlet.	Dalecarlia reservoir outlet.	Georgetown reservoir outlet.	McMillan Park reservoir outlet.	Filtered-water reservoir.
1909.					
July	2,900	(a)	3,000	950	65
August	1,900	(a)	1,200	140	37
September	1,000	375	(b)	130	31
October	800	750	475	475	60
November	1,800	1,300	1,200	400	22
December	120,000	50,000	30,000	19,000	1,300
1910.					
January	170,000	175,000	180,000	180,000	2,800
February	120,000	78,000	54,000	54,000	800
March	51,000	22,500	21,000	12,000	140
April	44,000	16,000	14,000	2,800	50
May	5,600	4,100	4,300	1,500	41
June	16,000	5,500	3,800	1,200	50
Fiscal years—					
1906-7	63,000	24,000	23,000	15,000	200
1907-8	80,000	65,000	52,000	19,000	900
1908-9	90,000	12,500	13,000	3,500	160
1909-10	170,000	175,000	180,000	180,000	2,800

(B) MINIMUM.

1909.					
July	90	(a)	75	75	8
August	37	(a)	43	22	3
September	80	140	(b)	24	4
October	70	100	90	39	9
November	200	130	180	65	7
December	160	80	60	28	6
1910.					
January	1,700	2,900	2,100	2,900	230
February	15,500	17,000	15,500	7,000	85
March	475	1,100	900	800	45
April	360	200	275	160	12
May	170	90	70	60	11
June	160	140	110	80	14
Fiscal years—					
1906-7	70	50	30	36	4
1907-8	16	17	28	16	4
1908-9	38	65	25	9	2
1909-10	37	80	43	22	3

(a) Reservoir out of service on account of constructing retaining walls and buttresses at the south connection.

(b) Reservoir out of service on account of lowering weir between basins.

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TABLE No. 2.—*Bacteria per cubic centimeter*—Continued.

(C) AVERAGES.

	Dalecarlia reservoir inlet.	Dalecarlia reservoir outlet.	Georgetown reservoir outlet.	McMillan Park reservoir outlet.	Filtered-water reservoir.
1909.					
July	540	(a)	515	254	33
August	400	(a)	322	57	18
September	322	241	(b)	70	18
October	340	272	262	130	20
November	595	500	510	180	13
December	21,000	9,100	5,900	4,500	250
1910.					
January	76,000	73,000	76,800	52,000	800
February	45,000	35,500	31,000	17,500	350
March	9,900	7,600	7,400	4,800	80
April	7,900	4,100	3,500	650	29
May	1,230	810	830	448	28
June	3,660	930	800	324	27
Fiscal years—					
1906–7	4,850	1,940	1,680	635	31
1907–8	6,300	2,700	2,940	1,250	55
1908–9	3,130	1,950	950	390	21
1909–10	14,300	13,850	10,850	6,820	143

[a] Reservoir out of service on account of constructing retaining walls and buttresses at the south connection.
[b] Reservoir out of service on account of lowering weir between basins.

TABLE No. 3.—*Results of tests for bacillus coli.*

(A) TOTAL SAMPLES EXAMINED.

	Great Falls or Dalecarlia reservoir inlet.			Dalecarlia reservoir outlet.			Georgetown reservoir.			McMillan Park reservoir (applied water).			Filtered-water reservoir.		Tap water from various parts of city.	
Cubic centimeters	10	1	0.1	10	1	0.1	10	1	0.1	10	1	0.1	10	1	10	1
1909.																
July	23	23	23	(a)	(a)	(a)	9	9	9	31	31	31	31	31	62	62
August	26	26	26	(a)	(a)	(a)	10	10	10	31	31	31	31	31	62	62
September	23	23	23	8	8	8	2	2	2	30	30	30	30	30	69	69
October	22	22	22	11	11	11	7	7	7	31	31	31	31	31	62	62
November	22	22	22	10	10	10	9	9	9	30	30	30	30	30	62	62
December	26	26	26	11	11	11	9	9	9	31	31	31	31	31	69	69
1910.																
January	25	25	25	9	9	9	8	8	8	31	31	31	31	31	63	63
February	23	23	23	19	19	19	20	20	20	28	28	28	28	28	59	59
March	27	27	27	26	27	27	27	27	27	31	31	31	31	31	73	73
April	24	24	24	25	25	25	26	26	26	30	30	30	30	30	62	62
May	23	23	23	25	25	25	25	25	25	31	31	31	31	31	61	61
June	22	22	22	26	26	26	25	25	25	30	30	30	30	30	70	70
Total for—																
1909–10	286	286	286	170	171	171	177	177	177	365	365	365	365	365	774	774
1905–6	108	108	108	155	155	155	121	121	121	169	169	169	171	171	80	80
1906–7	156	156	156	130	130	130	131	131	131	292	292	292	292	292	523	523
1907–8	307	307	307	65	65	65	122	122	122	351	351	351	351	351	765	765
1908–9	296	296	296	40	40	40	106	106	106	365	365	365	365	365	782	782

[a] Reservoir out of service on account of constructing retaining walls and buttresses at the south connection.

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TABLE No. 3.—*Results of tests for bacillus coli*—Continued.

(B) NUMBER POSITIVE.

	Great Falls or Dalecarlia reservoir inlet.			Dalecarlia reservoir outlet.			Georgetown reservoir.			McMillan Park reservoir (applied water).			Filtered-water reservoir.		Tap water from various parts of city.	
Cubic centimeters	10	1	0.1	10	1	0.1	10	1	0.1	10	1	0.1	10	1	10	1
1909.																
July	8	2	1	(a)	(a)	(a)	3	1	0	8	4	0	0	0	0	0
August	13	4	2	(a)	(a)	(a)	4	1	0	7	2	1	0	0	0	0
September	10	5	2	2	2	1	0	0	0	4	1	0	0	0	0	0
October	8	3	0	2	0	0	0	0	0	1	0	0	0	0	0	0
November	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
December	10	6	2	4	4	2	3	2	1	9	7	0	3	2	5	1
1910.																
January	18	12	6	4	3	1	6	2	0	19	11	3	8	1	10	2
February	11	10	4	12	4	1	8	6	1	9	2	0	1	0	0	0
March	9	4	0	8	3	1	8	6	2	4	1	0	0	0	0	0
April	10	8	5	10	8	4	10	6	4	7	4	0	0	0	1	0
May	11	4	0	13	5	0	9	4	1	5	4	0	0	0	0	0
June	21	19	7	21	12	5	16	7	2	13	2	0	0	0	1	0
Total for—																
1909–10	130	77	29	77	41	15	67	35	11	86	38	4	12	3	17	3
1905–6	38	21	10	62	36	8	32	18	2	41	14	3	4	3	1	0
1906–7	96	68	30	75	38	16	67	39	14	95	38	4	13	6	28	5
1907–8	137	96	40	21	8	2	42	27	5	78	33	5	10	1	24	7
1908–9	115	60	25	12	6	0	29	9	3	61	26	3	3	0	9	3

(C) PERCENTAGE POSITIVE.

1909.																
July	34.8	8.7	4.4	(a)	(a)	(a)	33.3	11.1	0.0	25.8	12.9	0.0	0.0	0.0	0.0	0.0
August	50.0	15.4	7.7	(a)	(a)	(a)	40.0	10.0	0.0	22.6	6.5	3.2	0.0	0.0	0.0	0.0
September	43.5	21.8	8.7	25.0	25.0	12.5	0.0	0.0	0.0	13.3	3.3	0.0	0.0	0.0	0.0	0.0
October	36.4	13.6	0.0	18.2	0.0	0.0	0.0	0.0	0.0	3.2	0.0	0.0	0.0	0.0	0.0	0.0
November	4.5	0.0	0.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
December	38.5	23.1	7.7	36.4	36.4	18.2	33.3	22.2	11.1	29.0	22.6	0.0	9.7	6.5	7.3	1.5
1910.																
January	72.0	48.0	24.0	44.5	33.3	11.1	75.0	25.0	0.0	61.3	35.5	9.7	25.8	3.2	15.9	3.2
February	47.8	43.5	17.4	63.2	21.1	5.3	40.0	30.0	5.0	32.2	7.1	0.0	3.6	0.0	0.0	0.0
March	33.3	14.8	0.0	30.8	11.1	3.7	29.6	22.2	7.4	12.9	3.2	0.0	0.0	0.0	0.0	0.0
April	41.7	33.3	20.8	40.0	32.0	16.0	38.5	23.1	15.4	23.3	13.3	0.0	0.0	0.0	1.6	0.0
May	47.8	17.4	0.0	52.0	20.0	0.0	36.0	16.0	4.0	16.1	12.9	0.0	0.0	0.0	0.0	0.0
June	95.5	86.4	31.8	80.8	46.2	19.2	64.0	28.0	8.0	43.3	6.7	0.0	0.0	0.0	1.4	0.0
Total for—																
1909–10	45.5	26.9	10.1	45.3	24.0	8.8	37.9	19.8	6.2	23.6	10.4	1.1	3.3	0.8	2.2	0.4
1905–6	35.2	19.4	9.3	40.0	23.2	5.2	26.4	14.9	1.7	24.3	8.3	1.8	2.3	1.8	1.3	0.0
1906–7	61.5	43.6	19.2	57.7	29.2	12.3	51.1	29.8	10.7	32.5	13.0	1.4	4.5	2.1	5.4	1.0
1907–8	44.6	31.3	13.0	32.3	12.3	3.1	34.4	22.1	4.1	22.2	9.4	1.4	2.8	0.3	3.1	0.9
1908–9	38.9	20.3	8.4	30.0	15.0	0.0	27.4	8.5	2.8	16.7	7.1	0.8	0.8	0.0	1.2	0.4

[a] Reservoir out of service on account of constructing retaining walls and buttresses at the south connection.

TABLE No. 4.—*Summary of expenditures and liabilities incurred.*

	Labor.	Materials.	Total.
Office and laboratory	$18,182.23	$2,697.60	$20,879.83
Pumping station	15,047.79	14,913.43	29,961.22
Filter operations:			
(a) Sand handling	5,777.56	402.26	6,179.82
(b) Repairs, etc.	4,953.30	1,213.20	6,166.50
New sand handling system	355.34	3,549.33	3,904.67
Parking (care of grounds, etc.)	7,899.37	3,655.51	11,554.88
Main office	2,953.96	399.12	3,353.08
Total	55,169.55	26,830.45	82,000.00

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TABLE No. 5.—*Amount of work done.*

	Million gallons water pumped to—		Number of filters—		Cubic yards sand—	
	Filters.	Sand washers.	Scraped.	Raked.	Removed and washed.	Replaced in filters.
1909.						
July	1,985.58	18.983	14.60	0	2,707	4,050
August	1,903.99	11.035	8.60	0	1,955	620
September	1,809.65	14.302	7.50	5	1,360	2,842
October	1,834.63	12.148	13.90	9	1,870	2,350
November	1,657.38	2.451	3.70	6	397	11
December	1,759.99	1.920	2.90	5	283	123
1910.						
January	1,937.20	2.822	5.00	7	703	134
February	1,688.07	3.824	5.00	1	1,058	371
March	1,737.45	4.103	4.30	2	985	1,008
April	1,749.69	11.816	15.80	6	2,852	2,159
May	1,790.68	6.094	2.90	2	693	3,042
June	1,751.13	2.279	3.00	8	642	166
Total for—						
1909–10	21,605.44	91.777	87.20	51	15,505	16,876
1905–6[a]	19,402.82	42.40	68.07	0	[b] 16,137	5,172
1906–7	24,417.73	138.70	97.76	9	[c] 25,689	34,781
1907–8	23,758.24	76.98	126.67	86	22,275	21,393
1908–9	22,435.16	119.16	137.80	36	24,683	23,487

[a] First filter put in service August 18; total water supply filtered after October 6.
[b] 8,324 cubic yards washed.
[c] 33,502 cubic yards washed.

TABLE No. 6.—*Cost per million gallons filtered.*

(A) LABOR.

Fiscal year.	Office and laboratory.	Pumping station.	Filter operations.		Parking (care of grounds, etc.).	Experimental filters.	Main office.	Total.
			Sand handling.	Repairs, etc.				
1905–6	$0.45	$0.45	$0.47	$0.02	$0.01	.....	$0.09	$1.49
1906–7	.57	.57	.58	.21	.07	$0.03	.04	2.07
1907–8	.70	.59	.42	.32	.15	.09	.09	2.36
1908–9	.72	.61	.41	.34	.22	.01	.13	2.44
1909–10	.84	.70	.27	[a] .25	.36	.....	.14	2.56

(B) MATERIALS.

1905–6	$0.04	$0.59	$0.02	.....	.....	.....	.....	$0.65
1906–7	.03	.67	.08	$0.20	$0.02	.....	.....	1.00
1907–8	.05	.54	.04	.07	.06	.....	$0.01	.77
1908–9	.10	.69	.05	.18	.18	.....	.02	1.22
1909–10	.13	.69	.02	[b] .21	.17	.....	.02	1.24

(C) TOTALS.

1905–6	$0.49	$1.04	$0.49	$0.01	$0.01	.....	$0.09	$2.14
1906–7	.60	1.24	.66	.41	.09	$0.03	.04	3.07
1907–8	.75	1.13	.46	.39	.21	.09	.10	3.13
1908–9	.82	1.30	.46	.52	.40	.01	.15	3.66
1909–10	.97	1.39	.29	.46	.53	.....	.16	3.80

[a] $0.02 for new sand handling system. [b] $0.16 for new sand handling system.

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TABLE No. 7.—*Average cost for labor for sand handling.*

(A) PER MILLION GALLONS PUMPED TO FILTERS.

Fiscal year.	Scraping.	Ejecting.	Washing.	Smoothing.	Raking.	Resanding.	Total.
1905–6	$0.06	$0.29	$0.02	$0.06	.....	$0.04	$0.47
1906–7	.07	.20	.05	.02	$0.00	.24	.58
1907–8	.09	.14	.03	.01	.02	.13	.42
1908–9	.07	.15	.03	.01	.01	.14	.41
1909–10	.05	.10	01	.01	.01	.08	.27

(B) PER CUBIC YARD OF SAND.

1905–6	$0.07	$0.35	$0.04	$0.07	.....	$0.14	$0.67
1906–7	.06	.19	.03	.02	$0.00	.17	.47
1907–8	.09	.15	.03	.01	.02	.14	.44
1908–9	.06	.14	.03	.01	.01	.13	.38
1909–10	.07	.14	.02	.02	.01	.10	.36

TABLE No. 8.—*Filter runs, or periods of operation.*

	Between scrapings or rakings.							Between scrapings.						
	Number of filters scraped or raked.	Duration in days.			Million gallons filtered.			Number of filters scraped.	Cubic yards sand removed.			Depth of scraping, in inches.		
		Maximum.	Minimum.	Average.	Maximum.	Minimum.	Average.		Maximum.	Minimum.	Average.	Maximum.	Minimum.	Average.
1909.														
July	14.60	89	44	67	229.01	106.27	163.29	14.60	338	121	185	2.51	0.90	1.42
August	8.60	74	51	60	175.54	124.94	156.58	8.60	356	149	227	2.65	1.11	1.63
September	12.50	98	53	68	237.52	114.37	161.70	7.50	524	97	181	3.90	.72	1.33
October	22.90	81	32	55	206.09	71.51	121.57	13.90	301	93	135	2.24	.69	1.00
November	9.70	79	37	51	168.19	82.32	109.01	3.70	134	81	107	1.00	.60	.81
December	7.90	63	50	59	144.35	106.11	128.81	2.90	133	126	98	.99	.94	.97
1910.														
January	12.00	95	72	85	204.38	146.58	176.08	5.00	195	112	141	1.45	.83	1.06
February	6.00	99	51	77	205.73	118.85	168.26	5.00	390	160	212	2.90	1.19	1.68
March	6.30	120	101	108	275.96	224.49	250.35	4.30	489	179	229	3.64	1.33	2.00
April	21.80	129	21	74	307.57	45.22	162.05	15.80	230	84	180	1.71	.62	1.23
May	4.90	86	32	59	186.04	69.79	124.53	2.90	320	132	231	2.38	1.79	2.00
June	11.00	129	61	83	213.70	130.85	171.52	3.00	249	190	214	1.51	1.41	1.46
Fiscal year—														
1909–10	138.20	129	21	70	307.57	45.22	154.96	87.20	524	81	179	3.90	.60	1.33
1905–6	68.07	195	38	91	497.45	116.66	241.30	68.07	600	71	238	4.47	.53	1.77
1906–7	106.76	199	30	75	466.12	101.53	217.78	97.76	536	52	261	4.00	.39	1.95
1907–8	212.67	138	9	46	477.19	20.11	121.46	126.67	498	46	180	4.10	.34	1.34
1908–9	173.80	135	11	46	298.08	39.26	115.17	137.80	580	55	206	4.32	.41	1.58

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TABLE No. 9.—*Pumping station (daily results).*

(A)

	Million gallons pumped—						Lift to filters.	Pressure at sand washer pumps per square inch.	Coal consumed per day in tons.			Station duty per 100 pounds coal consumed.		
	To filters.			To sand washers.										
	Maximum.	Minimum.	Average.	Maximum.	Minimum.	Average.			Maximum.	Minimum.	Average.	Maximum.	Minimum.	Average.
1909.														
July	76.16	57.65	64.05	1.140	.298	.730	24.18	110.0	13.4	8.4	10.8	67.8	52.3	61.4
August	69.31	54.44	61.42	.629	.157	.441	22.18	110.0	12.4	8.0	10.1	64.2	49.5	56.6
September	66.02	52.82	60.32	.831	.207	.572	22.26	110.0	12.7	8.7	10.5	61.0	48.9	55.1
October	78.50	48.12	59.18	.761	.060	.467	21.84	110.0	13.4	8.0	10.3	59.6	49.1	53.6
November	64.92	49.83	55.25	.468	.141	.272	20.49	110.0	11.3	7.9	9.2	55.6	45.7	51.1
December	67.83	48.32	56.77	.307	.039	.174	20.54	110.0	10.3	8.5	9.5	61.0	45.4	50.4
1910.														
January	70.04	51.02	62.49	.499	.008	.156	22.43	110.0	12.7	9.1	10.4	59.6	49.8	54.9
February	70.79	55.19	60.28	.284	.041	.173	21.44	112.3	12.3	8.7	10.2	57.4	44.8	51.5
March	59.11	51.64	56.04	.409	.063	.171	19.76	120.0	10.5	7.8	9.2	53.2	45.2	49.8
April	66.53	53.79	58.32	.715	.167	.474	20.78	120.0	11.1	8.1	9.7	58.7	47.2	53.7
May	61.93	54.55	57.76	.525	.059	.254	20.30	120.0	10.1	7.4	8.8	60.7	48.1	54.9
June	70.49	50.42	58.37	.281	.124	.207	21.19	117.3	12.3	7.4	9.1	60.1	49.9	54.4
Fiscal year—														
1909–10	78.50	48.12	59.19	1.140	.008	.373	21.45	113.3	13.4	7.4	9.8	67.8	44.8	54.0
1905–6[a]	80.59	57.18	66.07	2.062	.089	.747	21.71	107.4	14.8	6.4	8.9	79.6	48.2	62.8
1906–7	80.29	57.44	66.89	2.120	.023	.580	21.60	120.8	15.0	7.0	10.0	71.6	46.5	58.6
1907–8	80.38	54.35	64.91	.735	.017	.347	22.20	125.0	12.0	7.2	9.6	70.7	51.3	60.3
1908–9	78.93	47.83	61.47	.875	.060	.453	22.52	122.3	13.2	7.0	10.0	74.0	45.7	57.7

[a] Raw water shut off from city supply October 5.

(B)

Fiscal year.	Name of coal used.	Cost per ton.	Duty per 100 pounds coal consumed.	Cost of coal per million foot-pounds of work performed.
1905–6	Georges Creek Big Vein	$3.34	62.8	$0.00238
1906–7	do	3.43	58.6	.00261
1907–8	do	3.75	60.3	.00278
1908–9	Orenda	3.47	57.7	.00268
1909–10	do	[a] 3.15	54.0	.00255

[a] Corrected for increase or decrease in ash and British thermal units as determined by United States Geological Survey.

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TABLE No. 10.—*Summary of sanitary chemical analyses of weekly samples.*

[Results in parts per million.]

(A) MAXIMUM.

Reservoirs.	Turbidity.[a]	Ammonia.			Nitrogen as—		Hardness.	Alkalinity.	Chlorine.
		Free.	Albuminoid.	Total.	Nitrites.	Nitrates.			
Dalecarlia inlet	2,100	0.034	0.264	0.280	0.0070	0.45	120.0	106.0	5.4
Dalecarlia outlet[b]	200	.034	.180	.206	.0050	.70	115.0	105.8	5.7
Georgetown outlet[c]	215	.030	.182	.182	.0060	.60	115.0	105.0	4.9
McMillan Park outlet	120	.028	.126	.154	.0060	.65	118.0	104.4	4.2
Filtered water	9	.016	.078	.086	.0010	.70	119.5	106.3	4.5

(B) MINIMUM.

Dalecarlia inlet	7	.000	.016	.016	.0000	.00	52.9	39.5	1.0
Dalecarlia outlet[b]	7	.000	.040	.040	.0000	.00	54.3	38.2	.9
Georgetown outlet[c]	7	.000	.044	.044	.0000	.00	51.4	40.6	.7
McMillan Park outlet	2	.000	.010	.010	.0010	.00	51.4	38.5	.2
Filtered water	0	.000	.000	.000	.0000	.00	52.9	40.3	.4

(C) AVERAGE.

Dalecarlia inlet	86	.006	.107	.113	.0027	.19	98.2	81.4	2.9
Dalecarlia outlet[b]	30	.008	.106	.114	.0023	.18	95.5	79.5	3.4
Georgetown outlet[c]	29	.005	.101	.106	.0027	.18	93.4	80.9	2.9
McMillan Park outlet	18	.004	.077	.081	.0027	.17	94.0	83.0	2.7
Filtered water	1	.002	.027	.029	.0000	.19	94.9	84.0	2.8

[a] Summary of daily samples of water.
[b] Reservoir out of service July 1, 1909, to September 13, 1909.
[c] Reservoir out of service September 10, 1909, to October 4, 1909.

No chemical determinations made during February, March, April, and May, 1910, on account of rearrangement of laboratory and equipment.

TABLE No. 11.

(A) TABLE SHOWING NUMBER OF DEATHS FROM TYPHOID FEVER, BY MONTHS, IN THE DISTRICT OF COLUMBIA FOR THE FOURTEEN FISCAL YEARS PRECEDING THE DATE OF THIS REPORT.

Fiscal year.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	Total.
1896–97	8	15	25	25	18	16	13	4	4	4	6	9	147
1897–98	10	16	18	10	9	18	8	4	2	9	6	20	130
1898–99	24	22	22	28	21	16	10	4	7	6	3	6	169
1899–1900	9	38	30	28	27	26	17	6	8	10	5	12	216
1900–1	20	41	29	25	28	17	7	2	8	2	4	10	193
1901–2	16	33	28	21	22	16	19	8	12	9	13	9	206
1902–3	21	39	25	32	19	20	9	5	9	6	6	3	194
1903–4	17	26	18	19	8	14	5	5	6	10	8	8	144
1904–5	16	22	25	14	11	9	11	1	5	7	1	3	125
1905–6[a]	15	30	23	26	14	6	6	4	5	4	10	9	152
1906–7	21	32	21	25	17	4	7	6	4	6	7	2	152
1907–8	10	18	17	19	11	7	4	1	1	8	8	3	107
1908–9	15	13	23	17	16	13	16	8	3	8	7	7	146
1909–10	12	12	17	12	12	2	3	4	7	5	5	4	95
Average	15.3	25.5	22.9	21.5	16.6	13.1	9.6	4.4	5.8	6.7	6.4	7.5	155.4

[a] Filtered water supplied since October, 1905.

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(B) PRECEDING TABLE OF TYPHOID DEATHS REDUCED TO DEATH RATES PER 100,000 INHABITANTS PER YEAR.

Fiscal year.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	Annual death rate.
1896-97	35	65	109	109	78	70	56	17	17	17	26	39	53
1897-98	43	69	78	43	39	78	34	17	8	38	25	85	46
1898-99	102	93	93	119	89	68	42	17	29	25	12	25	59
1899-1900	37	158	125	116	112	108	69	24	33	41	20	49	74
1900-1	82	167	118	102	114	69	28	8	32	8	16	40	65
1901-2	64	132	112	84	88	64	75	31	47	35	51	35	68
1902-3	83	153	98	126	75	79	35	19	35	23	23	12	63
1903-4	66	100	69	73	31	54	19	19	23	38	30	30	46
1904-5	61	83	95	53	42	34	41	4	19	26	4	11	39
1905-6	56	111	85	97	52	22	22	15	18	15	36	33	47
1906-7	69	105	69	82	56	13	24	20	13	20	24	7	42
1907-8	35	64	60	67	39	25	14	4	4	28	28	11	32
1908-9	53	45	80	60	56	45	56	28	10	28	24	24	43
1909-10	42	42	60	42	42	7	11	14	24	17	17	14	28
Average monthly death rate	59	99	89	84	65	53	38	24	22	26	24	30	.....

EXPERIMENTAL STUDIES ON RATES OF FILTRATION.

In order to study the efficiency of slow sand filters when operated at different rates an experimental filter plant was installed and put into operation on September 9, 1908. This experimental plant consisted of six cylindrical galvanized-iron tanks, 4 feet in diameter and 9 feet high. The filtering materials were the same as those used in the large filters, and the method of operation was the same with the exception that the available loss of head in the experimental filters was about 7 feet, or 2 feet more than that of the large filters. The experimental filters were designated as Nos. 1, 2, 3, 4, 5, and 6. It was the original intention to operate filter No. 1 at a rate of 1,000,000; No. 2, 3,000,000; No. 3, 6,000,000; No. 4, 10,000,000; No. 5, 30, 000,000; and No. 6, 100,000,000 gallons per acre daily. This rate schedule was carried out in all cases with the exception of the 30,000,000 and 100,000,000 rates, which were so high as to be prohibitive on account of the excessive penetration of mud into the filter sand, which caused a very high initial loss of head. A rate of about 30,000,000 gallons was maintained by filter No. 5 from the time it was put into service, September 9, 1908, until November 8, 1909, when the rate was reduced to about 17,000,000 gallons. This latter rate was maintained until the latter part of February, when this filter was put out of service.

It was found to be impossible to maintain a rate of 100,000,000 gallons with filter No. 6 for more than a very few days at the beginning of each run. It was kept up to this high rate, however, as long as possible after each scraping until the end of the seventh run on October 17, 1908, when the filter was given a very deep scraping and resanded. After resanding, this filter partially regained its capacity and was operated at the original rate for a very few days, after which it gradually decreased until the latter part of December, when the rate was reduced to about 40,000,000 gallons. Without removing the old sand and resanding again it was found impossible to maintain a rate of 40,000,000 gallons, and consequently this rate gradually de-

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creased to about 23,000,000 gallons on March 13, 1909, when the filter was again resanded. When this filter was again put into operation March 17, 1909, the rate was reduced to about 20,000,000 gallons, and was operated at approximately that rate until it was again resanded November 8, 1909. This filter was again put into operation November 13, and from that date until it was put out of service, February 28, 1910, the rate was maintained at about 14,000,000 gallons. The summary of the results is shown in the following tables. In these tables it was found impracticable to arrange the data separately for each filter in all cases, since filters Nos. 5 and 6 were operated at such widely different rates at different times during the experiments. The data for these two filters are therefore arranged with reference to the rates of filtration and represent the results for rates of filtration rather than for individual filters.

TABLE No. 12.—*Summary of results of experimental filters.*

Filter number.....	1	2	3	4	5 and 6	6	5	6
Number of runs.....	3	6	11	12	6	9	22	16
Rate—million gallons per acre per day:								
Maximum.....	1.12	3.41	7.11	10.84	18.12	21.30	32.71	98.50
Minimum.....	1.03	3.19	6.09	9.17	12.08	17.38	21.22	24.05
Average.....	1.06	3.26	6.63	10.20	15.82	19.85	28.40	66.91
Length of run in days:								
Maximum.....	233.5	150.5	75.2	90.9	44.7	39.8	48.71	27.37
Minimum.....	181.7	42.0	14.5	10.1	22.8	6.9	.67	.62
Average.....	206.4	109.6	48.89	40.5	31.2	16.1	14.00	7.26
Million gallons filtered per acre per run:								
Maximum.....	242.61	484.46	534.67	960.72	728.43	784.25	1,463.35	1,022.27
Minimum.....	202.60	135.66	93.79	92.57	413.61	112.47	19.53	53.32
Average.....	218.58	302.82	326.76	417.23	484.84	316.21	353.88	385.75
Cubic yards of sand removed per acre at end of each run:								
Maximum.....	269.0	269.0	672.0	1,612.0	538.0	2,420.0	2,420.0	3,360.0
Minimum.....	269.0	134.0	101.0	134.0	404.0	269.0	134.0	101.0
Average.....	269.0	213.0	272.0	392.0	449.0	710.0	596.0	637.0
Cubic yards of sand removed per acre per 1,000,000 gallons filtered.....	1.23	.70	.83	.94	.93	2.24	1.68	1.65
Average initial loss of head.....	0.67	0.19	0.51	0.78	5.02	4.04	4.21	6.98
Turbidity—influent:								
Maximum.....	120.0	120.0	120.0	120.0	100.0	100.0	70.0	60.0
Minimum.....	2.0	2.0	2.0	2.0	2.0	3.0	3.0	6.0
Average.....	20.0	20.0	21.0	22.0	24.0	17.0	28.0	11.0
Turbidity—effluent:								
Maximum.....	11.0	13.0	17.0	18.0	47.0	13.0	30.0	30.0
Minimum.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Average.....	1.0	1.0	2.0	2.0	3.0	1.0	2.0	3.0
Per cent—reduction..	95.0	95.0	90.5	90.9	87.5	94.2	92.9	92.7
Bacteria—influent:								
Maximum.....	180,000.0	180,000.0	180,000.0	110,000.0	180,000.0	37,500.0	27,500.0	18,000.0
Minimum.....	22.0	20.0	22.0	20.0	180.0	24.0	25.0	45.0
Average.....	4,800.0	5,100.0	4,500.0	4,200.0	21,700.0	1,300.0	2,300.0	1,600.0
Bacteria—effluent:								
Maximum.....	4,000.0	1,300.0	3,200.0	5,400.0	12,800.0	500.0	750.0	1,650.0
Minimum.....	2.0	3.0	1.0	1.0	2.0	3.0	2.0	4.0
Average.....	160.0	85.0	110.0	120.0	520.0	38.0	55.0	125.0
Per cent—reduction..	96.7	98.3	97.6	97.3	97.7	97.2	97.7	92.3
Number of samples examined for bacillus coli in influent:								
10 c. c.....	549.0	478.0	476.0	436.0	158.0	146.0	246.0	111.0
1 c. c.....	560.0	492.0	486.0	445.0	163.0	148.0	253.0	113.0
$\frac{1}{10}$ c. c.....	525.0	459.0	452.0	413.0	167.0	129.0	234.0	105.0
$\frac{1}{100}$ c. c.....	511.0	443.0	439.0	405.0	161.0	122.0	228.0	101.0
$\frac{1}{1000}$ c. c.....	500.0	434.0	429.0	394.0	154.0	119.0	222.0	98.0

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TABLE No. 12.—*Summary of results of experimental filters*—Continued.

Filter number	1	2	3	4	5 and 6	6	5	6
Number of runs	3	6	11	12	6	9	22	16
Number of samples examined showing bacillus coli in effluent:								
10 c. c.	512.0	452.0	454.0	404.0	148.0	125.0	221.0	111.0
1 c. c.	513.0	454.0	457.0	406.0	153.0	125.0	221.0	111.0
1/10 c. c.	480.0	419.0	426.0	383.0	129.0	117.0	205.0	106.0
1/100 c. c.	478.0	406.0	410.0	367.0	117.0	117.0	201.0	102.0
1/1000 c. c.	478.0	406.0	410.0	367.0	117.0	117.0	201.0	102.0
Number samples positive—influent:								
10 c. c.	226.0	211.0	201.0	258.0	96.0	62.0	88.0	42.0
1 c. c.	127.0	123.0	116.0	108.0	72.0	33.0	44.0	25.0
1/10 c. c.	55.0	59.0	54.0	51.0	52.0	9.0	15.0	9.0
1/100 c. c.	26.0	34.0	33.0	33.0	40.0	3.0	6.0	3.0
1/1000 c. c.	6.0	6.0	5.0	6.0	6.0	0.0	0.0	0.0
Number samples positive—effluent:								
10 c. c.	100.0	109.0	134.0	98.0	91.0	22.0	53.0	34.0
1 c. c.	51.0	61.0	55.0	56.0	47.0	8.0	25.0	16.0
1/10 c. c.	9.0	13.0	16.0	16.0	12.0	0.0	4.0	7.0
1/100 c. c.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1/1000 c. c.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Per cent of samples showing bacillus coli in influent:								
10 c. c.	41.2	44.2	42.2	59.2	60.8	42.5	35.8	37.9
1 c. c.	22.7	25.0	23.9	24.3	44.2	22.3	17.4	22.2
1/10 c. c.	10.5	12.8	11.9	12.3	31.2	7.0	6.4	8.6
1/100 c. c.	5.1	7.7	7.5	8.2	24.9	2.5	2.6	3.0
1/1000 c. c.	1.2	1.4	1.2	1.5	3.9	0.0	0.0	0.0
Per cent of samples showing bacillus coli in effluent:								
10 c. c.	19.5	24.1	29.5	24.2	61.5	17.6	24.0	30.6
1 c. c.	10.0	13.4	12.0	13.8	30.7	6.4	11.3	14.4
1/10 c. c.	1.9	3.1	3.8	4.2	9.3	0.0	2.0	6.6
1/100 c. c.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1/1000 c. c.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cost per million gallons for:								
Sand handling	$0.43	$0.25	$0.29	$0.33	$0.33	$0.50	$0.38	$0.37
Interest charges at 3 per cent.	6.85	2.25	1.12	.73	.48	.40	.29	.14
Total	7.28	2.50	1.41	1.06	.81	.90	.57	.51

Coli tests presumptive.

While the results shown in the tables are somewhat erratic in a few places, they show in a general way that fairly good results may be obtained with the slow sand type of filter, at any rate between 1,000,000 and 20,000,000 gallons per acre daily. With the class of sand used in the filters at Washington it seems impracticable to operate filters in the usual way above that rate.

At times, when the applied water is fairly good, the effluents were found to be satisfactory at all rates. When the applied water is very turbid and contains large numbers of bacteria, however, the effluents are unsatisfactory at all rates. From the data gathered from these experiments, the efficiencies of the filters varied very little for any of the different rates of filtration, the results for a rate of 15,000,000 gallons being apparently about as good as for 1,000,000 gallons.

It would be more or less difficult to operate the slow sand filter plant at a very high rate, since the runs would be short, the percentage of time the filters were out of service for cleaning would be large, and the reserve filter area and capacity would be small. It seems reasonable in the light of these experiments, however, to

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assume that the large filters in the Washington filter plant could be operated at double the present rate, and that with the necessary changes in the pumping plant, the piping, and with the addition of another filtered-water reservoir these filters would be capable of giving fairly satisfactory results when treating 150,000,000 gallons per day.

These experiments indicate that no water carrying an excessive amount of turbidity or bacteria should be applied to slow sand filters, even when they are operated at very low rates. It is therefore necessary to give the applied water a preliminary treatment of some sort when its condition is unusually bad.

Previous experiments under this office have shown that the only satisfactory preliminary treatment for the water under consideration is the use of chemicals for coagulating and purifying it.

With the facilities which will be available after the coagulating plant has been put into operation, perfectly satisfactory effluents may be expected from the filters at all times.

The cost for operating filters at different rates seems to vary very little. The annual charges for interest on the cost for constructing filters decreases very rapidly with the increased rate of filtration, and the experiments would seem to indicate that to construct a filter plant for rates as low as 2,500,000 gallons is unnecessary, unless it be for future increase in consumption.

TABLE No. 13.—*Appropriations for the Washington Aqueduct, District of Columbia filtration plant, dates of acts, and reversions to the Treasury.*

June 6, 1900		$200,000.00
March 1, 1901		500,000.00
July 1, 1902		600,250.00
March 3, 1903		600,000.00
April 27, 1904		1,568,155.00
June 27, 1906		80,000.00
March 2, 1907		[a] 90,000.00
May 26, 1908		82,000.00
March 3, 1909		82,000.00
Total		3,802,405.00
Reverted to Treasury	$44,166.63	
Reappropriated under head of parking	[a] 6,000.00	
Outstanding liabilities, June 30, 1910	10,360.67	
		60,527.30
Net amount expended		3,741,877.70
(*a*) For construction		3,378,845.99
For maintenance and operation		363,031.71
(*b*) Paid by United States		1,870,938.85
Paid by District of Columbia		1,870,938.85

ABSTRACT OF CONTRACTS IN FORCE.

Contractor: Merchants Coal Company of Pennsylvania, for bituminous coal.
Date of contract: July 14, 1909.
Approved: July 24, 1909.
Date of commencement: August 19, 1909.
Date of completion: Before July 1, 1910.
Amount and rate: Furnishing and delivering 3,600 tons, (*a*) Orenda, at $3.15 per ton; (*b*) Elk Lick, at $3.01 per ton.

[a] Unexpended balance of appropriation for $90,000, act of Congress, March 2, 1907, reappropriated for parking grounds, McMillan Park reservoir, and expended under head of Washington Aqueduct.

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The remodeling of Georgetown reservoir will be made necessary by the proposed system of coagulation in order to flush out the sediment that will be deposited from the water after treatment at the coagulating plant. The necessity for the preliminary treatment of the water is discussed under the head of "Maintenance and operation," pages 2365 to 2372, Annual Report of the Chief of Engineers, U. S. Army, 1908, where is also explained the necessity of remodeling this reservoir. The work proposed will complete the works for the preliminary treatment of the water supply, for which an estimate of $108,000 is submitted.

PARKING M'MILLAN PARK.

An appropriation of $2,000 was made in the act to provide for the expenses of the District of Columbia for the fiscal year 1911 for continuing the parking of McMillan Park. For continuing this work an estimate of $8,000 for the fiscal year 1912 is submitted. No money being available, no work of improvement was done during the fiscal year 1910, except in the maintenance of the portion of the grounds used for purposes of the filtration plant, in which case the filtration-plant funds were applicable.

In order to complete the work of parking according to the prepared plans it will be necessary to cover the area south of the dam with soil, to seed it with grass, and set out various kinds of shrubs and trees. It will also be necessary to build walks and steps leading from the low to the high areas, to sod all steep slopes, and to build a wading pool.

While the area under consideration is now graded to nearly its final lines, its surface is of clay, which will not support a growth of grass, so that it will be muddy in wet weather, dusty in dry weather, and always unsightly until the work is completed.

The prepared plans for the parking of McMillan Park also provide for planting of shrubs and trees and for certain changes in roads and sidewalks, etc., north of the dam.

The necessity for the prompt installation of meters is explained in the report on "Increasing the water supply of the District of Columbia," House Document No. 347, Sixty-first Congress, second session. The finding in this report that a new aqueduct was not necessary was based on the assumption, among others, that metering of all services in the District of Columbia would be immediately provided for. In the appropriation for the expenses of the District of Columbia for the fiscal year 1911, an appropriation was made to meter the supply to certain public buildings. An estimate of $45,000 is submitted to complete the installation of meters on all the services to public buildings, reservations, or grounds.

It is also urged that a large appropriation, as recommended in the House document referred to above, be made for the general installation of meters on all private water services, under the engineer department of the District of Columbia.

While the work done by the engineer department of the District of Columbia to detect and prevent the waste of water is highly commendable and the results accomplished are exceptional, a study of the consumption of water in the District of Columbia in its relation

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to air temperatures has led the officer in charge to conclude that the necessity for the general and complete installation of meters is still very urgent, not only to remove the necessity of an expenditure of $4,000,000 or $5,000,000 for the construction of a new aqueduct, but also to remove the possibility of the consumption of water exceeding the maximum capacity of the aqueduct, which is still likely to happen in case of the recurrence of a period of cold weather similar to that of the winter of 1904–5.

The officer in charge has recomputed the consumption of water for weekly periods from January, 1903, to October, 1905, based on the latest information on the hydraulics of the Washington Aqueduct. From the results obtained it appears that the average rate of consumption of water for the month of April, 1904, was 57.2 million gallons per day. The average rate of consumption for April, 1910, was 58.3 million gallons per day. In the investigations of the consumption of water in relation to temperatures it developed that in the months of April and November the temperatures are such as not to affect the consumption of water, so that the consumption of water during these months forms a fair basis of comparison for different years. It will be noted that the consumption for April, 1910, was slightly higher than for April, 1904. It would be reasonable, therefore, to expect that, if the winter of 1910–11 should be similar to that of 1904–5, the consumption will at least equal the high consumption in February, 1905, when the demand exceeded the maximum capacity of the aqueduct, and a failure of the system to meet the demands was threatened, unless the difference between the present conditions and those of 1904–5 is such as to prevent a recurrence of a threatened failure of supply to meet the demands. These conditions are controlled by the number of water services metered and unmetered, and the probable waste from a metered service as compared with an unmetered service.

In 1905 there were 51,931 unmetered and 2,104 metered services. At present there are about 48,038 unmetered and about 15,879 metered services. There are about 3,893 fewer unmetered services and about 13,775 more metered services than in 1904–5. It appears therefore that if the average metered service should waste twenty-eight one-hundredths as much as the average unmetered service, then 13,775 metered services would waste as much as 3,893 unmetered services, and under this condition the demand for water during a period of extreme cold weather next winter, similar to that of 1904–5, would equal the demand for water made during the cold winter of 1904–5. That there is waste from a metered service in periods of cold weather is evident from the fact that cities having nearly or all services metered experience the increased demand for water during cold periods, although the demand is not as heavy as it would be if all services were unmetered. It is believed that the waste from a metered service is not less than, and in general is probably more than, twenty-eight one-hundredths of the waste from an unmetered service. It is therefore the opinion of the officer in charge that all services should be promptly metered to reduce the normal consumption of water so that the danger stated above shall be removed.

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QUARTERS FOR ASSISTANT TO OVERSEER AT GREAT FALLS, MD.

It has always been difficult to secure the services of a reliable and intelligent person to assist the overseer at Great Falls in the performance of his duties, owing to the lack of suitable and convenient habitation for such a person, no suitable building in the neighborhood being available for renting.

There is submitted an estimate of $2,500, or so much thereof as may be necessary, to provide the labor and purchase materials of construction not now available in order to provide quarters for the assistant to the overseer at Great Falls.

COMPLETING SURVEYS FOR INCREASING THE WATER SUPPLY.

A report on the results of the preliminary investigations and surveys for increasing the water supply of the District of Columbia was submitted from this office by Maj. Jay J. Morrow, Corps of Engineers, U. S. Army, July 8, 1909, and was published as House Document No. 347, Sixty-first Congress, second session. Reference to increasing the water supply by use of the Patuxent River as a source is made on pages 4, 5, 7, 8, 84, and 85 of the said report. On page 8 Major Morrow reports:

> It is estimated that these studies could be made at a cost of $3,000, and that an appropriation therefor should be made at a reasonably early date, as it should be borne in mind that should this project be adopted for ultimate construction the necessary legal preliminaries would add possibly two years to its time of completion over the time necessary to complete the work of providing a new conduit from Great Falls.

The present officer in charge of the aqueduct concurs in this opinion, and desires to state that on account of the failure to provide, in the appropriation for the expenses of the District of Columbia for the fiscal year 1911, for the prompt installation of meters on all services in the District of Columbia, as repeatedly urged in the report mentioned above, the necessity for the work provided in this estimate becomes urgent in order to determine as soon as possible the best method of increasing the water supply, with a view to submitting to Congress, as soon as practicable, an estimate for beginning the construction of a new aqueduct. If the prompt installation of meters shall be provided for in the District appropriation bill for the fiscal year 1912, as recommended by Major Morrow in his report on increasing the water supply, there will be no need of submitting to Congress an estimate for a new aqueduct.

An estimate of $3,000 is submitted for completing the investigations and surveys to determine the availability and adaptability of the Patuxent River as a source of water supply for the District of Columbia.

LINING CERTAIN UNLINED PORTION OF THE AQUEDUCT.

There is in the aqueduct a total length of 4,364 feet of tunnel through rock, which is unlined. The best engineering practice of the present day would require all tunnel in rock to be lined for use as an aqueduct. In these unlined sections of the aqueduct there are certain places where the rock is disintegrating and falling from the roofs and sides of the tunnels. Such portions of the unlined sections of the tunnels should be lined for the sake of the stability of the aqueduct,

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and to remove the danger to the lives of employees engaged in cleaning or inspecting the aqueduct. To do this work it will be necessary to drain the aqueduct between Great Falls and Dalecarlia reservoir, thus interrupting the supply of water from the river. During the time that the supply is thus interrupted the city will draw on the reserve supply, which is limited to such an extent that, for the present average daily consumption of water, it will be possible to keep the aqueduct drained for approximately only four consecutive days. It will then require about fourteen days for the reservoirs to refill. It is therefore estimated that it will be practicable, under present conditions of consumption of water, to work on the lining of the tunnel only sixty-four days in a year, making allowance for seventy-seven days between the middle of December and the end of February, when it will not be possible to interrupt the supply from the river on account of the probability of excessive demand for water in the city during periods of very cold weather. Under such conditions the work of lining the tunnels will not be continuous, and on this account, and on account of the locations of the sections to be lined and the restricted space in which it will be possible to work, the work will probably extend over more than one fiscal year and will be more expensive than work of the same character under favorable conditions. Under these conditions an accurate estimate can not be submitted, but the cost is not expected to exceed $20,000. An estimate of $12,000 is, therefore, submitted to cover the purchase of the plant necessary and not now on hand, and to do as much work as may be possible during the fiscal year 1912.

EMERGENCY FUND.

It was not necessary to make any expenditures from the appropriation of $5,000 for emergency use during the fiscal year 1910. Before the custom of making appropriations of $5,000 for use in emergency was established, when a break or other contingency occurred, necessitating any unlooked-for expenditure, it was necessary to stop ordinary operations so as to cover the extraordinary expense. Should, however, a serious break occur during the last part of the fiscal year, the funds available might be inadequate and a disastrous condition result. A continuation of the appropriation of $5,000 is recommended to constitute an emergency fund.

CONSTRUCTION OF THE METROPOLITAN SOUTHERN RAILROAD THROUGH THE DALECARLIA RESERVATION OF THE WASHINGTON AQUEDUCT.

For the history of this work attention is invited to Annual Report of Chief of Engineers, 1909, page 2316, and Annual Report of Chief of Engineers, 1893, page 4288. Work on this construction was continued during the year by the railroad company (Baltimore and Ohio Railroad), and was nearly completed at the end of the fiscal year. The necessary inspection charges were paid from the deposit of $1,500 made by the company in accordance with the regulations, approved by the Secretary of War, governing the construction of the railway.

DREDGING DALECARLIA RESERVOIR.

The unexpended balance on July 1, 1910, which was covered by outstanding liabilities, was disbursed.

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APPENDIX F F F.

IMPROVEMENT AND CARE OF PUBLIC BUILDINGS AND GROUNDS IN THE DISTRICT OF COLUMBIA—WASHINGTON MONUMENT.

REPORT FOR THE FISCAL YEAR ENDING JUNE 30, 1910. OFFICER IN CHARGE, COL. SPENCER COSBY, U. S. ARMY.

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OFFICE OF PUBLIC BUILDINGS AND GROUNDS,
Washington, July 11, 1910.

GENERAL: I have the honor to submit the following report of operations of the office of public buildings and grounds in the District of Columbia under the Chief of Engineers during the fiscal year ending June 30, 1910:

The various duties assigned to the officer in charge of public buildings and grounds are at present as follows:

1. Maintenance, care, and repair of the Executive Mansion, grounds, and greenhouses.
2. Improvement, policing, care, and maintenance of various parks and reservations in the District of Columbia.
3. Improvement, care, and maintenance of the portion of Potomac Park west of the railroad embankment.
4. Care and maintenance of the Washington National Monument.
5. Care and maintenance of the propagating gardens.
6. Care of the building No. 516 Tenth street NW., where Abraham Lincoln died.
7. The preservation, care, and safety of buildings occupied by the War Department in the District of Columbia, except State, War, and Navy Department building.
8. Care and repair of the government telegraph line connecting the Capitol with the various departments and Government Printing Office.
9. Care and maintenance of the highway bridge across the Potomac River, District of Columbia.
10. Furnishing and planting trees, shrubs, etc., in the grounds of the Library of Congress, of the Capitol, and of executive departments.
11. The immediate charge of the banks of the Potomac River from the north line of the arsenal (or Washington Barracks) grounds to the southern curb line of N street SW.
12. Care of the monument at Wakefield, Va., the birthplace of Washington, and the iron pile dock at the mouth of Bridge Creek, Virginia.

Executive and disbursing officer of the following commissions:

13. Grant Memorial Commission.
14. Von Steuben Statue Commission.
15. Barry Statue Commission.
16. John Paul Jones Statue Commission.
17. Columbus Memorial Commission.
18. In charge of the monument at Fredericksburg, Va., to the memory of Gen. Hugh Mercer.
19. Member of the commission created by the public buildings act approved May 30, 1908, to cause plans and estimates to be prepared for a suitable armory for the National Guard of the District of Columbia.
20. Secretary and disbursing officer of the Commission of Fine Arts, created by act approved May 17, 1910.
21. Military aide to the President.

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1. EXECUTIVE MANSION, GROUNDS, AND GREENHOUSES.

Care of Mansion.—The work required to maintain the house in good condition was carried on in a systematic manner throughout the year. The hard-wood floors in particular require much attention in the way of cleaning, waxing, etc., and this was done with regularity. The tile floors in the entrance vestibule and in the main corridor on the first floor were also given constant attention.

Repairs.—Minor repairs were made to doors and windows. Twenty-four new lockers were constructed in the police room in the East Terrace and painted. Twenty-one new wire screens were made, painted, and fitted in the windows on the ground floor. All the window and door screens were put in place in May for the summer. A passageway was cut through the wall between the two kitchens in order to give access to the dumb-waiter from the large kitchen. The plaster in the West Terrace, the kitchen, main hall, and East Terrace was repaired. A concrete floor, composed of steel I beams and concrete arches, was constructed over the boiler pit on the ground floor. All broken window glass was replaced with new.

Heating.—The heating system was looked after and kept in proper order. The large range boiler and heater were removed from the large kitchen and placed in the engine room. The large kitchen range was overhauled and put in first-class condition.

Plumbing.—The plumbing fixtures were examined regularly and maintained in good order. A new enameled sink was placed in the small closet off the small kitchen, and a second one placed in the servants' dining room in the West Terrace.

Lighting, etc.—The electric plant was overhauled and maintained in good condition. The electric wiring was gone over and new wires were put in where necessary. All of the chandeliers and fixtures were thoroughly cleaned. Burned-out electric lamps were replaced with new.

Elevator.—Necessary attention was given to the elevator and to its operating machinery. The elevator switchboard on the ground floor was given a thorough overhauling and all parts found worn out were replaced with new.

Fire alarm.—In December the fire-alarm system was changed so that the auxiliary system would not send in the alarm to headquarters but would, instead, register it in the ushers' room, where the man on duty would send in the alarm to the fire department.

Painting.—The following portions of the Mansion were painted:

On the exterior the old paint on the east end, on the south front, and on the west end was burned off; the surfaces were then sandpapered and given four coats of paint; the remainder of the main building was given two coats of paint. The exteriors of the East Terrace and West Terrace were also given two coats of paint, and 49 tree tubs and 42 plant boxes on the terraces were painted.

On the second floor the old paint in the library, the housekeeper's room, and the nursery was burned off, and the woodwork given four coats of paint. The northeast bedroom was also painted.

On the first or parlor floor the old paint in the Green Room was burned off and the woodwork given two coats of paint.

On the ground floor the two kitchens and both pantries, all the rooms in the West Terrace, the entire interior of the East Terrace

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(with the exception of the hat boxes), and the wine room were given two coats of paint.

Furniture and furnishings.—Furniture was repaired and the frames rubbed down wherever necessary. In August all the carpets were taken up, thoroughly cleaned, and stored for the summer. The wall covering of the Red and Blue parlors was cleaned with the air-cleaning apparatus, and the white cotton wall coverings put up for the summer. These were taken down in the autumn. All of the curtains and draperies were taken down, cleaned, and stored. The old covering on the walls of the Green Room was taken down and new green silk velour put up in its place. All the furniture in the Green Room was refinished and reupholstered in the same material as before. All the portieres on the first floor were relined and new fringe put on them. The furniture in the ushers' room was refinished and reupholstered, using the old leather. The furniture in the housekeeper's room was refinished. The furniture in Mrs. Taft's room, in the library, and in the room between was upholstered and re-covered and new window draperies made and placed at the windows. Lace curtains were purchased and put up at the windows of the Green, Blue, and Red rooms. In October the draperies were rehung in place in all the rooms, the rugs put down, and the house put in order for the return of the President from the summer vacation.

Social functions.—During the year this office did more or less work, as called upon, for four state dinners, eight small dinners, four musicales, four evening receptions, one day reception, one dance, and four garden parties. For the receptions the necessary rearrangement of furniture was made, and attendants were provided for the hat boxes and the dressing rooms. For the dinners the tables were put in place and the usual floral decorations provided. After each of these functions the house was restored to its usual condition. New temporary lines of telephones were put up for use in calling carriages at the evening functions and attendants provided for operating them.

Inventory of property.—The sundry civil act approved June 25, 1910, provides:

SEC. 9. Hereafter the steward, housekeeper, or such other employee of the Executive Mansion as the President may designate, shall, under the direction of the President, have the charge and custody of and be responsible for the plate, furniture, and public property therein, and shall, before entering upon the duties of the office, give bond for the faithful discharge thereof, said bond to be in the sum of ten thousand dollars, and be approved by the Secretary of War. And hereafter a complete inventory, in proper books, shall be made annually in the month of June, under the direction of the officer in charge of public buildings and grounds, of all the public property in and belonging to the Executive Mansion, showing when purchased, its cost, condition, and final disposition. This inventory shall be submitted to the President for his approval, and shall then be kept for reference in the office of public buildings and grounds, which shall furnish a copy thereof to the steward, housekeeper, or other employee responsible for the property.

Under the above provision of law, a complete inventory of the public property in the White House was made in June, 1910, under the direction of this office, by Mr. W. McC. Sauber, an expert who was detailed for the purpose from the office of the Supervising Architect of the Treasury. This inventory was approved by the President on June 27, 1910. It is in duplicate and the copies will be disposed of in accordance with the law quoted above.

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Executive Office Building.—The usual care was extended to the building from July 1 to August 9, 1910. On the latter date it was turned over to the contractors for the erection of the addition, the clerical force, furniture, etc., having in the meantime been moved into rooms on the ground floor of the Mansion where temporary offices were established. The building was remodeled according to the plans of the architect, Mr. Nathan C. Wyeth. The brick exterior was stuccoed to harmonize with the addition and given five coats of paint. The walls, ceiling, and woodwork in the extra clerks' room, the main vestibule, the staff room, and the small connecting rooms were given two coats of paint. The old rubber covering on the floors was taken up and the maple floors thoroughly cleaned, stained, shellacked, and waxed. All the walls and ceilings in the basement were given one coat of water paint. The top wood panels in the basement doors were taken out and glass ones put in place. Additional telephones were put in, connecting the extra clerks' room with staff room. A new umbrella rack was made and placed in position at the main entrance. A new ventilating fan was put in position and the vent ducts from the Cabinet room and President's room were connected with it. Eighteen large window screens, 5 small ones, and 2 double screen doors were made, painted, and fitted. Minor repairs were made from time to time as required to the doors, windows, woodwork, and heating apparatus throughout the building.

Stable of Executive Mansion.—Minor repairs were made as required to doors, windows, and plumbing fixtures. All the woodwork in the living quarters was given four coats of paint. The walls and ceilings in four rooms were papered, and the kitchen walls and ceiling painted. The floors were stained and shellacked. The floor and stalls in the north stall room, the walls and ceilings of the harness room, the garage, and the footman's room were given two coats of paint. The harness cases were grained and varnished. All the windows in the living quarters were reputtied. The large double swinging doors of the garage were changed so as to roll on a track, and then painted. The sink in the kitchen was taken out and replaced by a new enamel one. Repairs were made to the roof over the living quarters.

Stable of public buildings and grounds.—Minor repairs were made to doors, windows, floors, and plumbing fixtures.

Greenhouses, Executive Mansion.—These houses are located at the propagating gardens. Necessary care was extended to the large collection of plants, which were maintained in good condition. The flues of boilers were cleaned, boilers repaired, and leaking pipe joints recalked. Decayed woodwork and broken glass were replaced.

Considerable painting was done in the interiors and to the exteriors of the houses. A new frame roof was built over the stoke hole and covered with tarred roofing felt. Forty-one sash were reglazed and fitted over a cold frame. Minor repairs were made to the brickwork in the potting shed. A new plant bench, with an iron pipe frame, was erected in the orchid house. Fifty evergreen trees that had stood on the terraces of the Executive Mansion during the winter were placed in new tubs.

Grounds of the Executive Mansion.—These grounds were maintained in good condition. Lawns were mown, and roads, walks, side-

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VIEW OF THE EXECUTIVE OFFICE BUILDING, LOOKING NORTHEAST FROM THE STATE DEPARTMENT.

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VIEW OF THE PRESIDENT'S OFFICE.

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walk pavements, gutters, and drain traps regularly cleaned. The shrubbery and trees were pruned as required. Bare places on lawns were loosened and sodded. The shrubbery and the lawns were given a heavy coating of well-rotted stable manure. The iron fence south of the Executive Office that was taken down during the erection of the addition to that building was reerected and rambler rose bushes planted along it. One hundred and eleven feet of spruce hedge was planted south of the office. A new tennis court was constructed in the grounds west of the south fountain. One thousand four hundred and thirty feet of privet hedge was planted inside the iron fence around the south end of the grounds.

In accordance with custom, the grounds were opened to the children on Easter Monday, March 28, 1910, from 9 a. m. to 1 p. m., for the egg rolling. The grounds were afterwards cleaned up and the accumulated rubbish removed.

In the colonial gardens south of the east and west terraces the grass was cut, gravel walks rolled, cobblestone gutters cleaned, hedges trimmed, and climbing roses and vines tied. Three hundred and two new rose bushes were planted. Seventy-five feet of box edging that had died was replaced with new plants. Two thousand seven hundred bulbs were planted in the autumn for spring flowering, and 4,000 bedding plants were set out in May, 1910, for summer decoration. In the late autumn the bay trees on the roofs of the east and west terraces were taken down, hauled to the propagating gardens, and placed in the bay-tree house for the winter. Their places on the terraces were filled during the winter and early spring months with evergreen trees in tubs and boxes, which were hauled from the propagating gardens for the purpose.

BUILDING FOR OFFICES OF THE PRESIDENT.

A contract for the erection of additional accommodations to the building for offices of the President, for which Congress appropriated $40,000 in sundry civil act approved March 4, 1909, and $13,500 in the urgent deficiency act approved August 5, 1909, was entered into on August 6, 1909. The contractors broke ground for the addition on August 9, 1909, and from that date to its completion on October 31, nine days in advance of the contract time, work progressed at a very rapid rate. New furniture, rugs, etc., were purchased and installed in the building, which was reoccupied by the clerical force on October 31, 1909.

The altered building affords nearly twice as much space as before, and is much more conveniently arranged in every way. The President's room is oval in shape and is provided with special ventilating and air-cooling arrangements. The Cabinet room is on one side of it and the secretary's room on the other, while the waiting rooms are separated from it by a wide corridor. The whole interior presents a roomy and dignified appearance. The height of the building has not been increased at all, and from the outside it is as inconspicuous as before.

Two photographs, one showing an exterior view of the building, the other showing the President's office, accompany this report.

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2. PARKS AND PUBLIC RESERVATIONS IN THE DISTRICT OF COLUMBIA.

For the purposes of administration all the parks under this office are divided into four divisions, viz:

1. Northwest division: All west of North Capitol street and north of B street north.
2. Southwest division: All west of North and South Capitol streets and south of B street north, except Potomac Park and Monument Grounds.
3. East division: All east of North and South Capitol streets.
4. Potomac Park and Monument Grounds.

The area covered by the park spaces of the District of Columbia under the charge of this office is about 700 acres.

There are, in all, 343 reservations, varying in size from 250 square feet to 301 acres. They are classified as follows:

	Number.	Acres.
Highly improved	110	338.94
Partially improved	127	333.95
Unimproved	106	27.12
Total	343	700.01

During the year 12 park spaces were added to the system by the transfer to the Chief of Engineers by the Commissioners of the District of Columbia of the following parcels of ground under authority granted by section 2, paragraph (*b*), of the act of Congress approved July 1, 1898:

Number given to reservation.	Location of reservation.	Area.	Date of transfer.
		Sq. feet.	
317	Triangle, bounded by Georgia avenue, Kansas avenue, and Varnum street nw.	3,235	Apr. 12, 1910
318	Triangle, bounded by Georgia avenue, Upshur, and Ninth streets nw..	7,133	Do.
319	Triangle, bounded by New Hampshire avenue, Seventh, and Taylor streets nw.	8,864	Do.
320	Trapezium, bounded by Randolph street, Illinois avenue, Rock Creek Church road, and Fourth street nw.	6,012	Do.
321	Triangle, bounded by Quincy street, Rock Creek Church road, and Fifth street nw.	7,594	Do.
112	Virginia avenue, Ninth and C streets sw	4,245	Apr. 20, 1910
112a	West side of Ninth street, between Virginia and Maryland avenues sw...	5,260	Do.
199	Maryland avenue, Ninth and C streets sw	2,490	Do.
322	Triangle, bounded by Randolph street, New Hampshire avenue, and Eighth street nw.	9,026	May 3, 1910
323	Triangle at intersection of Rock Creek Church road and New Hampshire avenue nw.	829	June 2, 1910
77a	Triangle, north side of Massachusetts avenue, at New Jersey avenue, First, and G streets nw.	6,608	July 2, 1910
77b	Triangle, south side of Massachusetts avenue at New Jersey avenue, First, and G streets nw.	2,712	Do.

The area of one reservation was increased by the transfer on September 27, 1909, to the Chief of Engineers from the Commissioners of space resulting from the reduction in area of street sidewalks when laying new cement pavements. The reservation is:

277*b*, North Capitol street, Quincy street and Lincoln road, area increased from 855 square feet to 1306 square feet.

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The following described ground was transferred by the Chief of Engineers to the Commissioners of the District of Columbia under the authority of section 4 of the law above quoted:

December 4, 1909: Reservation 277*c*, at the intersection of North Capitol street and Lincoln road, between Quincy and R streets NE. A portion of the reservation containing 247 square feet for sidewalk purposes. This reduced the reservation from 2377 square feet to 2130 square feet.

March 12, 1910: Reservation 75, Massachusetts avenue, between Third and Fourth streets NW. A strip 4 feet wide on the Massachusetts avenue side, containing 720 square feet for sidewalk purposes. This reduced the area of the reservation from 5,400 to 4,680 square feet.

March 12, 1910: Reservation 76, Massachusetts avenue, between Third and Fourth streets NW. A strip 4 feet wide on the Massachusetts avenue side, containing 640 square feet for sidewalk purposes. This reduced the area of the reservation from 7,320 to 6,680 square feet.

There was also taken from the park system one park space under a provision in the District of Columbia appropriation act, approved May 18, 1910, which authorizes the Chief of Engineers to transfer to the Commissioners of the District of Columbia, for use as a property yard, unimproved reservation No. 185, which is a small triangle, containing 4,625 square feet, at the intersection of O street, New York and Florida avenues NE. The act authorizes and directs the commissioners to retransfer the reservation to the jurisdiction of the Chief of Engineers when, in his judgment, the use of the reservation for park purposes is desirable.

During the fiscal year part of the $26,000 appropriated for "Improving various reservations" was devoted to improving nine reservations (Nos. 77*a*, 77*b*, 112, 126, 199, 200, 236, 237, and 322, a total of about 2.17 acres) hitherto unimproved. The improvements consisted in a general way in grading, soiling, seeding, making flower beds, and introducing water.

In addition to the seven reservations improved, the macadam drive forming B street north, on the northern boundary of Potomac Park, extending from Virginia avenue to Twenty-sixth street west, was completed by the construction of the portion between Twenty-first and Twenty-sixth streets. This drive was also extended eastward along the southern half of B street from Virginia avenue to Sixteenth street west. Additional work for the improvement of the interior portion of Potomac Park was accomplished, and the roads of approach to the bridge across the inlet to the tidal reservoir were graded, covered with cinders, and provided with gutters.

MAINTENANCE OF IMPROVED PARKS.

The improved parks and park spaces were maintained in good condition during the year. The work consisted in mowing and raking lawns, edging their borders, sodding or seeding bare places, planting and caring for flower beds, pruning trees and shrubs, trimming hedges, removing dead trees, cleaning gutters and draintraps, and sweeping paved roads and walks. In the autumn of 1909 some of the

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flower beds were planted with pansy plants and some with flowering bulbs for early spring bloom. In these plantings 28,000 pansies and 32,000 bulbs were used. In the spring of 1910 the beds were planted with 559,628 bedding plants and 6,000 tropical plants for summer decoration. These beds were protected in most cases by hooped irons placed around them.

The special efforts made by this office during the last five years to renew the bare places and worn borders on the lawns by resodding have been continued, and during the year 7,682 square yards of sod were used for the purpose, vastly improving the appearance of the parks.

In addition to the general work referred to above the following special work was done:

NORTHWEST DIVISION.

Dupont Circle.—3,660.6 linear feet of 2-inch by 4-inch cement coping were constructed along both edges of the walks through the circle. The grade of the ground back of the coping was changed to meet the new conditions.

Franklin Park.—Four old and partly decayed trees were taken out, and 476 flowering shrubs and 83 trees were planted. The water service was extended, using 708 feet of 1¼-inch galvanized iron pipe. The sand box for children was emptied and filled with clean sand.

Judiciary Park.—A storm on July 16, 1909, blew down four large trees. These as well as their stumps and roots were cut up and hauled to the dump. Repairs were made to 19 square yards of old cement walk, and 43 square yards of new cement walk were laid at the southwest corner of the park where 57 linear feet of 8-inch cement coping were constructed. The granite steps leading to the two walks north of the Pension Office were reset. Along the Fifth street side of the park, between D and E street, 363.2 linear feet of 8-inch cement coping were laid. The ground back of this coping was torn up and brought to proper grade. The bare strip of ground along both edges of the walks that were laid last spring was graded and sodded. New sills were put under the lodge house, all the woodwork of the building was thoroughly repaired, a new paroid roof put on, and the interior and exterior of the building given two coats of paint.

Lafayette Park.—The cement area ways, about 5 square yards in extent, outside of both water-closets in the lodge house were torn up and relaid. Repairs were made to the brick gutters. The water service was extended, using 203 feet of 1¼-inch galvanized iron pipe. The gun carriages around the statue of General Jackson were given two coats of paint.

Mount Vernon Park.—902.7 square yards of cement walk 10 feet wide bordered with 1,676.6 linear feet of 5 inch by 16 inch cement coping were constructed.

Presidents Park (grounds south of Executive Mansion inclosure).—Twenty-six thousand four hundred and ninety-five square yards of macadam roadway were cleaned of dust and horse droppings and covered with an asphaltic oil. The roads leading from the main roadway around the Ellipse to the northeast and southwest corners were covered with broken stone, which was thoroughly rolled. The area covered was about 2,000 square yards.

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Reservation 36a (Louisiana avenue, Seventh and C streets NW.).—The Stephenson Grand Army Memorial was erected in this circle. The ground was graded, covered with good soil and sodded, using 770 square yards of sod.

Reservation 72 (Massachusetts avenue, Sixth and I streets NW.).—The water service in this reservation was extended, using 94 feet of 1¼-inch galvanized-iron pipe.

Reservation 77a (Massachusetts avenue, First and G streets NW.).—This reservation was rough graded, using 194 square yards of clay hauled in without expense to the Government. The reservation was inclosed with an 8-inch cement coping, 430 feet in length.

Reservation 77b (Massachusetts and New Jersey avenues NW.).—This reservation was rough graded, using 270 square yards of clay, hauled in without expense to the Government. It was covered with top soil, seeded, and planted with shrubbery. A cement coping, 314 feet in length, was constructed around the reservation.

Reservation 173 (New York avenue, Tenth, and I streets NW.).—The water service was extended, 100 feet of 1¼-inch galvanized pipe being used.

Reservation 174 (New York avenue, Tenth, and I streets NW.).—The post and chain fence around this reservation was removed and replaced by 540 linear feet of 8-inch cement coping, with 8 small cement posts at entrances to walks. The grade of the reservation was raised to conform to the new conditions, using 175 cubic yards of clay, hauled in without expense to the United States. The reservation was sodded, using 151 square yards of sod cut from portions of the public grounds where grading was to be done. The water service was extended, 100 feet of 1¼-inch pipe being used.

Reservation 190 (New Jersey avenue, Fourth, and P streets NW.).—The water service was extended, 72 feet of 1¼-inch galvanized-iron pipe being used.

Reservation 191 (New Jersey avenue, Fourth, and N streets NW.)—The water service was extended, 33 feet of 1¼-inch galvanized-iron pipe being used.

Reservations 193 and 194 (New Jersey avenue, Second, and I streets NW.)—These reservations had been very much reduced in area during the fiscal year 1908–9 by the widening of New Jersey avenue in their vicinity. The old asphalt walks were taken out in March, 1910, and the entire area of both reservations was regraded, soiled, and seeded, and a sod border 2 feet wide laid around each. A 16-foot flower bed was made in the center of reservation 194.

Reservation 277b (North Capitol and Quincy streets NE.).—The reservation was inclosed with an 8-inch cement coping 193.2 feet in length. The entire area of the reservation was regraded, a sod border laid, and the interior seeded and rolled.

Reservation 277c (North Capitol and Quincy streets NE.).—181.4 linear feet of 8-inch cement coping were laid around this reservation, the reservation regraded, a border of sod laid, and the remainder of the ground seeded and rolled.

Reservation 322 (New Hampshire avenue, Eighth, and Randolph streets NW.).—Water was introduced into this hitherto unimproved reservation, using 37 feet of 1-inch lead pipe and 97 feet of 1¼-inch galvanized-iron pipe. One 20-foot flower bed was made and planted.

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SOUTHWEST DIVISION.

Henry Park and Seaton Park.—The roadway that formerly went over the bridge across Sixth street, connecting these two parks, was closed for almost two years, until the spring of 1910; at first because the bridge was unsafe, and later because of lack of funds to lower the grade of the road after the bridge had been removed. A temporary road was cut through the embankment and was opened to traffic in March, 1910. In April and May the portion of the embankment in front of the Fish Commission building in Henry Park was removed, 967 cubic yards of clay and 128 cubic yards of gravel being handled in the work. One hundred and fifty-three cubic yards of soil were used in surfacing, and 58 square yards of sod were laid along the Sixth street side of the area. Eighty-eight square yards of flag walk were laid, 3,870 square yards of lawn surface sown with rye and grass seed, and 44 square yards of cobble-stone gutter constructed.

Smithsonian grounds.—Six trees were blown down by a storm on July 16. They were cut up and hauled away to the dump. The water service in the south side of the park was extended, using 108 feet of 2-inch and 196 feet of 1¼-inch galvanized-iron pipe.

Reservations 112 and 119 (Maryland and Virginia avenues, Ninth, and C streets SW.).—These unimproved reservations were graded, soiled, and seeded. Water was introduced into both reservations, using 30 feet of 1-inch lead pipe and 12 feet of 1¼-inch galvanized-iron pipe.

Reservation 112a (Maryland and Virginia avenues, Ninth, and C streets SW.).—Water was introduced into this unimproved reservation, using 94 feet of 1¼-inch galvanized-iron pipe.

Reservation 113 (Maryland avenue, between Seventh and Ninth streets SW.).—Three new flower beds, each 16 feet in diameter, were made in this reservation.

Reservation 200 (Maryland avenue, Seventh and C streets SW.).—This unimproved reservation was graded, using 121 cubic yards of clay filling hauled from Henry Park. Its entire area was covered with top soil 4 inches thick, a border of sod laid, and the remaining surface seeded and rolled. Flowering shrubs and trees were planted and a 16-foot flower bed made in the center. Water was introduced, using 33 feet of 1-inch lead pipe and 7 feet of 1¼-inch galvanized-iron pipe. The brick walk across the base of the reservation was repaired.

EAST DIVISION.

Garfield Park.—A cement wading pool 20 feet by 40 feet, with an 8-foot cement walk around it, was constructed. The water supply and drainage for the pool is so arranged that a fountain effect can be produced when the pool is not in use for wading. A photograph of the pool accompanies this report.

Lincoln Park.—The lodge house was thoroughly repaired. New sills were placed under the building and all woodwork that showed signs of decay was taken out and replaced with good material. The interior and exterior of the lodge were given two coats of paint. The two drinking fountains and the two large display fountains were

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VIEW OF WADING POOL AND CHILDREN'S PLAYGROUND, GARFIELD PARK, SOUTH CAROLINA AVENUE AND THIRD STREET SE.

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painted. Two extensions were made to the water supply, using 212 feet of 1¼-inch galvanized-iron pipe.

Reservation 88 (Massachusetts avenue and A street, between Thirteenth and Fourteenth streets, SE.).—This reservation was graded and surface soiled, the terraced portion sodded with 478 square yards of sod, the remainder of the area seeded and rolled, and a 16-foot flower bed made in the center. Water was introduced, using 43 feet of 1-inch lead pipe and 17 feet of 1¼-inch galvanized-iron pipe.

Reservation 126 (Virginia avenue, Eleventh and Potomac streets SE.).—The unimproved eastern end of this reservation (between Tenth and Eleventh streets) was laid out, gravel walks were made and bordered with sod, and the area bounded by the walks was regraded, soiled, seeded, and rolled.

Reservations 236 and 237 (North Carolina avenue, Fourteenth and B streets NE.).—These unimproved reservations were graded, soiled, seeded, planted with flowering shrubs, and a sod border laid around each; water was introduced into both, using 10 feet of 1-inch lead pipe and 6 feet of 1¼-inch galvanized-iron pipe for Reservation 236, and 12 feet of 1-inch lead pipe and 6 feet of 1¼-inch galvanized-iron pipe for Reservation 237.

Reservation 238 (North Carolina avenue, Fifteenth and B streets NE.).—Water was introduced, 42 feet of 1-inch lead pipe and 43 feet of 1¼-inch galvanized-iron pipe being used.

Center parking on Pennsylvania avenue, between Second and Fourteenth streets SE.—Cement landings were constructed at the intersecting streets where the cars of the Capital Traction Company stop to take on and discharge passengers. Twenty-two landings were put in place, covering an area of 1,005 square yards. The portion of the landings 2 feet outside of the car tracks was paid for by the Traction Company.

WATER PIPES, DRAINPIPES, AND FOUNTAINS.

Repairs were made to water pipes and valves where necessary and new valves put on. In the autumn the water was shut off from the various parks and the hose valves removed and taken to the shops at the nursery and repaired during the winter. In the spring the valves were replaced and the water turned on. During the year the following additional galvanized-iron water pipe was laid in the parks, as mentioned in detail elsewhere in this report: Two hundred and twenty-two feet of 4-inch pipe, 5,670 feet of 2-inch pipe, 3,987 feet of 1¼-inch pipe, and 194 feet of ¾-inch pipe, a total of 10,022 feet.

Stoppages were removed from drainpipes and repairs made to broken pipes as required. The following quantity of additional drainpipe was laid during the year: Fifty-eight feet of 6-inch, 220 feet of 10-inch, 271 feet of 12-inch, and 422 feet of 15-inch terra-cotta pipe, and 160 feet of 6-inch and 185 feet of 4-inch cast-iron pipe, a total of 1,156 feet. Eight drain traps were built.

The fountains were given regular attention and repairs made to supply pipes, waste pipes, and valves. The display fountains and their jets were cleaned weekly except in winter, when the jets were removed and stored until spring. New dippers were placed on the drinking fountains where needed. The water was turned off during the winter. Two display fountains and two drinking fountains were painted.

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LIGHTING THE PUBLIC GROUNDS.

The following parks are lighted with electric arc lights:

	Lights.
Executive Mansion grounds	5
President's Park	9
Monument Park	12
Franklin Park	9
Judiciary Park	9
Lincoln Park	8
Lafayette Park	6
Propagating Gardens	6
Potomac Park driveways	67
Total	131

Forty of these lights were erected in Potomac Park during the year.

The number of gas lamps in the public grounds not connected with meters lighted during the year was 225. One was taken down during the year. All these lamps are equipped with mantle burners of 60 candlepower. The lamp-posts were painted in June, 1910.

WALKS, ROADS, CURBING, AND COPING.

Walks.—Nine hundred and forty-five square yards of cement walks were constructed. One thousand and five square yards of cement landings were laid along the center parking on Pennsylvania avenue east, where the cars stop to take on and let off passengers.

Roads.—Eleven thousand four hundred and twenty square yards of gravel roads were resurfaced with broken stone. Nine thousand one hundred and twenty square yards of macadam roads were constructed with a water-gas tar as a binder, and 4,060 square yards were constructed using a heavy asphalt oil as a binder. One hundred and thirty-eight thousand one hundred and forty-three square yards of macadam roads were oiled with a first application and 19,401 square yards were reoiled, the first application having been given last year.

Curbing and coping.—Substantial and gratifying progress was made during the year in constructing cement copings around reservations, with corner posts of similar materials at entrances to walks. A total length of 2,078 feet of coping and 8 corner posts were built during the year, the work having been done under contract. There was also constructed 5,948 linear feet of cement coping along the edges of walks inside two of the parks.

SETTEES, MANURE, POST-AND-CHAIN FENCES, REMOVING SNOW AND ICE, LODGES.

Settees.—During the year 200 park settees were repaired and 245 were painted. All loose settees in the parks were refastened to the ground by stakes.

Manure.—Green manure received from Government stables and over 1,960 cubic yards received from other sources, without expense to the United States, was piled in the compost grounds at Eighteenth and B streets NW. This, when rotted, made 1,500 cubic yards, which was hauled out to the various parks in December, 1909, and spread

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over the lawns and around shrubs and young trees. In the spring this manure was raked in and the refuse removed. Forty-five tons of shredded cattle manure and 10 tons of bone meal were also purchased and spread over lawns. The location of the compost grounds was changed in September, 1909, from Eighteenth and B streets to a point about 600 feet south of B street, between Eighteenth and Nineteenth streets NW. In December, 1909, 906 feet of 1¼-inch galvanized-iron pipe were laid to furnish a new water supply to these grounds.

Post-and-chain fences, etc.—Repairs were made to post-and-chain fences as required. The iron post-and-chain fence inclosing Reservation 174 was taken down and replaced by a cement coping. A large number of the iron wickets used in constructing low fences for protecting flower beds and for preventing trespassing on lawns were straightened, cleaned, and painted.

Removing snow and ice.—The snow and ice were removed as soon as possible after each storm from the walks around and through the various parks. When, through freezing, the snow could not readily be removed, sand was sprinkled and the slush and dirt removed as soon as a thaw set in. There were in all ten falls of snow between December 25 and March 4.

Park lodges.—Various repairs were made to the woodwork and to the plumbing of two of the park lodges; the interiors and exteriors of the buildings were painted, and broken glass in the windows was replaced.

CHILDREN'S PLAYGROUNDS.

In accordance with law, authority was granted in the summer of 1905 by the officer in charge of public buildings and grounds to the Washington Playgrounds Association for the temporary use of reservations Nos. 19 and 126, in the southeastern part of the city, as children's playgrounds. During the summer and fall of 1908 a number of complaints were received from residents in the vicinity of the two reservations that their use for playground purposes constituted a serious nuisance. Upon investigation it was found that most of the abuses complained of were due to the fact that the playgrounds had not been under proper supervision, and permission for their use was temporarily revoked. It was, however, again granted the association on June 8, 1909, under regulations which it was hoped would remove the cause of complaint. These hopes were realized, as no complaints were received from any source during the summer and fall of 1909. In view of this gratifying fact authority was granted on June 28, 1910, for the use of the two reservations and for a portion of Garfield Park for the season of 1910.

PARK WATCHMEN.

During the year ending June 30, 1910, the public parks and reservations under the office of public buildings and grounds were policed by the park watchmen, numbering 38 privates and 2 sergeants. Twenty-one privates and one sergeant were on duty during the day (most of them from 8 a. m. until 4 p. m.) and 17 privates and one sergeant were on duty at night (most of them from 4 p. m. until mid-

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night). The only parks policed after midnight are Iowa Circle, Henry and Seaton parks, and the Smithsonian Grounds, which are policed until 2 a. m. Both sergeants and 17 of the privates do duty on bicycles; the remainder of the men are on foot. The general conduct of the men was good, and but few of them were reported for infractions of the regulations.

The watchmen enforced the police and park regulations in the parks, public travel on the park roads was regulated by them, fast driving kept down, the lawns, shrubbery, trees, and flower beds were protected from injury, women and children were protected from annoyance, known vagrants and loafers were kept out of the parks, all people under the influence of liquor were ejected, and all rowdyism and disorder was prevented. The many visitors to the city who pass through the parks were courteously directed and given any desired information. In addition, extra details of park watchmen were made for band concerts, baseball games, statue unveilings, athletic events, etc.

The members of this police force are known as "park watchmen." This is a misnomer and should be changed to "park policemen." When the force was first organized and named, the men's duties were purely those of watchmen, as they took care of the parks, watered the plants, etc., and performed no police duties, these being in the hands of the Metropolitan police. Later they were reorganized and placed in uniform, but no change was made in their designation. If this change is made, it is believed that it will result in an increased authority in their dealings with the public.

It is considered absolutely necessary that 20 of the park watchmen should have bicycles, as the beats covered by them are of such a length that a man on foot would find it impossible to perform properly his duty in protecting the parks and reservations assigned to him. A policeman on a bicycle is twice as efficient as one on foot. There are at present 19 bicycles available for the use of the park watchmen; of this number, 1 is new, 1 has been in service one year, 7 two years, 7 three years, 1 four years, 1 five years, and 1 six years. It is estimated that by the end of the year 10 of these will be beyond repair and will have to be replaced by new machines, and an estimate has been submitted for their purchase. After the purchase of these 10 new bicycles, the $400 appropriated annually will, it is hoped, be sufficient to allow of the purchase of four new bicycles each year, as well as the necessary repairs, and this should be enough to keep the men properly mounted.

The park watchmen are not furnished with revolvers, and the men have to buy their own. A revolver is a necessary part of a policeman's equipment, and he should be allowed a small amount of ammunition for target practice. Although for some years past there has been an appropriation "for purchase and repair of bicycles and revolvers for park watchmen and purchase of ammunition," the entire amount has been required for the bicycles and it has been found impossible to save any of this money for the purchase of revolvers. This year an estimate is submitted for the purchase of these revolvers—the sum needed being in addition to that required for bicycles.

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An estimate of $2,800 is submitted " for purchasing and supplying uniforms to park, monument, and bridge watchmen." After a careful consideration of the needs of the men to keep them at all times neatly uniformed, the estimated sum of $2,800 was obtained by allowing $54 each to 29 footmen and $50 each to 20 bicycle men. The balance ($234) will be required for contingencies and the initial issues to new men joining the force.

Furnishing the men with uniforms will prove of benefit in a number of ways. It will, of course, mean much to the men themselves, who are probably the most poorly paid men in the United States doing police duty in a large city, as they receive only $60 a month, and out of this now have to buy uniforms. When the force of park watchmen was first organized the men received the same rate of pay as at present, and were not required to wear uniforms; their duties were not as arduous or important, as they had no police duties, but simply took care of the parks. Later they were given police authority, and it was found necessary to have them uniformed, but no additional compensation was given them for the extra expense involved. To furnish them uniforms means practically no increase in pay, but simply puts them back in their old pay status.

This sum of $2,800 is asked for instead of the increased rate of pay that has been recommended for several years past, and which would have meant nearly $10,000 additional expense yearly to the Government.

Another great advantage of the proposed system will be that with the furnishing of the uniforms in the hands of this office it will be possible to make the men keep themselves in a more presentable condition than at present. As the men have to buy their uniforms out of their pay, they are allowed to wear them as long as they are serviceable, even at times when they are shabby and worn. Consequently they do not always present the neat appearance they should. This is very noticeable when the park watchmen are on duty with members of the Metropolitan Police Department, who, although they are required to furnish their own uniforms, receive a much higher rate of pay.

By the act of Congress approved February 28, 1901, and amended by act of Congress approved March 1, 1905, the Commissioners of the District of Columbia are authorized and directed to deposit with the Treasurer of the United States, out of receipts from fines in the police court and receipts from dog licenses, a sufficient amount to meet any deficiency in the policemen's fund or firemen's fund. The proceeds from arrests made by park watchmen in the way of fines and forfeited collateral amount to from $1,200 to $2,000 a year. This sum is, under the above acts, added to the pension fund of the Metropolitan police and firemen. It would seem only just that the park watchmen should be included in the benefits of this fund.

The table on the following page shows that in the parks for which watchmen are provided there were 341 arrests made during the year, and that the fines imposed and collateral forfeited in these cases amounted to $1,367; that in addition to the arrests made 1,841 drunken people and 780 persons of objectionable character were ejected from the parks.

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	1909.						1910.						
	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	Total.
NATURE OF OFFENSE.													
Disorderly conduct	27	24	16	18	9	7	6	....	9	9	9	9	143
Drunkenness	....	3	5	6	2	5	3	3	4	6	7	9	53
Vagrancy	5	5	11	4	5	1	....	....	2	2	2	2	39
Disorderly assembly	4	10	....	3	....	....	....	....	....	....	....	9	26
Indecent exposure	1	2	....	....	....	4	2	1	1	2	3	1	17
Violation of park regulations	5	5	1	1	....	....	....	....	....	1	....	....	13
Violation of police regulations	....	....	....	....	2	1	1	....	....	....	4	....	8
Trespass	1	....	....	1	2	....	....	1	1	....	....	1	7
Assault	....	1	....	....	1	....	....	....	1	2	....	2	7
Cruelty to animals	....	....	....	....	....	1	....	1	2	1	....	....	5
Larceny	....	....	1	....	1	1	....	....	1	....	1	....	5
Throwing missles	....	....	....	....	....	....	....	....	....	....	4	....	4
Fast driving of automobiles	....	....	....	1	....	....	....	1	....	....	....	....	2
Discharging firearms	....	....	....	....	....	....	....	....	2	....	....	....	2
Insane	....	....	....	1	....	....	....	....	....	....	....	1	2
Carrying concealed weapons	....	....	....	1	....	....	....	1	....	....	....	....	2
Fast driving of horse	....	....	....	1	....	....	....	....	....	....	....	....	1
Colliding	....	....	....	....	1	....	....	....	....	....	....	....	1
Escaping prisoner	1	....	....	....	....	....	....	....	....	....	....	....	1
Attempting suicide	1	....	....	....	....	....	....	....	....	....	....	....	1
Fugitive from home	....	....	1	....	....	....	....	....	....	....	....	....	1
Driving on wrong side	....	....	....	....	....	1	....	....	....	....	....	....	1
Total number of arrests	46	50	34	37	23	20	13	8	23	23	30	34	341
Drunkards ejected	302	291	258	157	181	110	27	29	73	216	147	50	1,841
Objectionable characters ejected	152	172	148	66	45	25	15	4	31	70	32	20	780
DISPOSITION OF CASES.													
Fined	24	14	5	6	8	5	4	....	7	4	7	3	87
Forfeited collateral	9	23	5	12	3	8	4	4	7	4	5	15	99
Sent to workhouse	10	9	13	3	4	1	....	....	2	3	5	3	53
Drunkards released	....	3	5	6	2	5	3	3	4	6	7	9	53
Dismissed	....	1	1	2	4	1	1	....	....	1	2	....	13
Personal bonds taken	1	....	1	1	....	....	....	....	....	3	3	3	12
Placed under bonds	....	....	3	4	....	....	....	....	1	....	....	1	9
Cases nolle prossed	....	....	1	2	....	....	....	1	1	1	1	....	7
Turned over to the Metropolitan police	2	....	1	....	....	....	....	....	1	....	....	....	4
Continued	....	....	....	....	....	....	....	....	....	1	....	....	1
Turned over to parents for correction	....	....	....	....	1	....	....	....	....	....	....	....	1
Sent to jail	....	....	....	....	1	....	....	....	....	....	....	....	1
Total cases disposed of	46	50	34	47	23	20	13	8	23	23	30	34	341
RECORD OF FINES.													
Total amount of fines	$217	$140	$32	$40	$80	$45	$40	....	$46	$60	$38	$15	$753
Total amount of collateral forfeited	32	84	36	90	35	95	17	$45	35	28	20	97	614
Total fines and collateral forfeited	249	224	68	130	115	140	57	45	81	88	58	112	1,367
MISCELLANEOUS.													
Sick and injured sent home or to hospital	....	2	4	2	3	3	1	....	3	4	4	3	29
Total accidents	....	....	1	....	2	....	3	....	2	....	1	....	9
Drowning cases	1	1	....	....	....	....	....	....	....	....	....	....	2
Abandoned infants found in parks	....	....	....	....	....	2	....	....	....	....	....	1	3
Dead infants found	....	....	....	....	....	....	....	....	....	....	....	1	1

BAND CONCERTS.

The concerts in the city parks by the engineer band from Washington Barracks and the Fifteenth U. S. Cavalry band from Fort Myer, which, with the approval of the Secretary of War, were inaugurated in 1904, were given again in the summer of 1909 and resumed in

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June, 1910. The concerts were given on Mondays, Tuesdays, Thursdays, and Fridays, in the following-named parks:

Judiciary Park.—July 8, 13, 29, August 12, 19, 26, September 2, 9, 16, 28, 1909; June 7, 14, 21, 1910.

Smithsonian grounds.—July 9, 15, 30, August 9, 24, 31, September 13, 24, 1909; June 6, 1910.

Franklin Park.—July 5, 20, August 2, 16, September 3, 14, 1909; June 13, 24, 1910.

Iowa Circle.—July 12, 22, 28, August 13, 27, September 21, 1909; June 16, 1910.

Dupont Circle.—July 16, August 20, September 20, 1909.

Washington Circle.—July 26, August 10, September 7, 27, 1909; June 17, 1910.

Garfield Park.—July 6, 19, August 6, 23, September 17, 1909; June 19, 28, 1910.

Lincoln Park.—July 1, 23, August 5, 17, 30, September 23, 1909; June 2, 10, 1910.

Reservation 31½ (Logan Park), Anacostia, D. C. (Pierce street, between Washington and Jackson streets).—July 2, August 3, September 10, 1909; June 3, 1910.

To accommodate the bands a portable band stand and camp stools were provided, which were hauled to the park the day of the concert and removed the day following. Lamps were provided at the night concerts for the musicians. Ice water was also furnished them.

In addition to the concerts mentioned above, the usual Wednesday afternoon concerts in the Capitol grounds and the Saturday afternoon concerts in the grounds south of the White House were given by the Marine Band, from July 1 to September 30, 1909, and in June, 1910. Concerts were also given at the new band stand in Potomac Park by the engineer band and cavalry band on Wednesday and Saturday afternoons from October 2 to 23, 1909; by the Marine Band on the same afternoons from October 27 to November 13, from April 16 to May 28, 1910, and on Tuesday afternoons from May 31 to June 14, and by the engineer band and cavalry band on Saturday afternoons from June 4 to 18, 1910.

8. POTOMAC PARK AND MONUMENT GROUNDS.

Maintenance of improved portions, West Potomac Park.—The water service was extended, 80 feet of 1¼-inch galvanized-iron pipe and 203 feet of ¾-inch pipe having been used. Connections for 5 hose valves were put in. Sixty-one thousand four hundred and ninety-one square yards of macadam roadways were oiled with an asphaltic oil, the work being done under contract. Sixty-four tons of trap-rock screenings were used in repairing macadam roads. One hundred linear feet of brick gutter was taken up and relaid, and 3,168 feet were repaired. Five hundred and seventeen cubic yards of cinders were used in repairing walks and bridle paths. Fifty-five square yards of sod were laid along the edges of bridle paths. Wistaria and ampelopsis vines were planted around the band stand. In the nursery in the east section the stock was cultivated and cared for.

Improvement of West Potomac Park.—A road of approach at each end of the new bridge across the inlet to the tidal reservoir was constructed. One thousand two hundred square yards of roadbed were graded and covered with cinders, and 814 linear feet of brick gutter 2 feet wide were constructed; 196 feet of 6-inch terra-cotta pipe were laid and 2 catch basins built to drain the gutters, and 54 granite stones placed along their edges to protect them from damage by vehicular traffic. In constructing the embankments of the

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approaches to the bridge about 1,900 cubic yards of filling material was used, which was received without expense to the United States. One hundred and eighty-eight flowering shrubs and 3 trees were planted on the west approach to the bridge, and 365 flowering shrubs were planted on the east approach. A cinder bridle path was built connecting the bridle path over the outlet gates of the tidal reservoir with the bridle paths along the shore. One hundred and twenty feet of 6-inch terra-cotta pipe was laid to drain the low areas. Eighty-five square yards of cement walk and 160 linear feet of cement coping were built at the ends of this bridge. The bridle path across the bridge was completed and ready for use in May, 1910. Marking stones were placed along the roadways at each quarter-mile point from the entrance to the park at Seventeenth and B streets NW. Fifty thousand square yards of the area west of the tidal reservoir were graded, soiled, and seeded. Four horse jumps were constructed along the bridle paths. Fifty-three willow trees were planted along the river front.

A photographic view of the new bridge across the inlet accompanies this report.

Potomac drive.—The section of this drive where it crosses the outlet to the old sewer canal was constructed and completed, 1,820 square yards of macadam road being built and 600 linear feet of brick gutter 2 feet wide laid. Seventy-six large elm trees and 25 double flowering cherry trees were planted on either side of the drive, between the old sewer canal and the circle. Thirty cast-iron posts were set around the circle and 240 feet of steel chain run through them to prevent trespassing across the circle.

Park roadway along B street north from Virginia avenue westward to the Potomac River.—As stated in the last annual report, the portion of this roadway between Virginia avenue and Twenty-first street west was completed in November, 1908; work for grading the embankment for that portion between Twenty-third street and the river was commenced in April, 1909, and by June 30, 1909, 5,330 square yards of its surface had been graded. This work was continued in July, 1909, and completed in August; the construction of the roadway, curb, and gutters was then immediately commenced, and completed in November, 1909. Payment for the land in squares 63 and 89, condemned for the portion of the roadway between Twenty-first and Twenty-third streets, was completed early in the fiscal year and that portion was then graded and the roadway completed by November 1. One hundred and seventy-eight Norway maples were planted along the roadway. A new water supply was brought into the part of the park south of this roadway by tapping the 8-inch water main at Twenty-second and Water streets, and running a 4-inch cast-iron pipe south to the south side of B street. Two-inch supply pipes were run east and west from this point. Marking stones were placed along the roadway at the one-fourth, one-half, and three-fourths mile points west of the intersection of Seventeenth and B streets. The following shows the work done in constructing the roadway between Twenty-first street and the river:

Macadam driveway constructed	square yards	8,125
Vitrified brick gutters, 36 inches wide, laid	linear feet	4,046
Cement curb constructed	do	4,046
Concrete catch basins built		6
Area graded, soiled, and seeded	square yards	5,000

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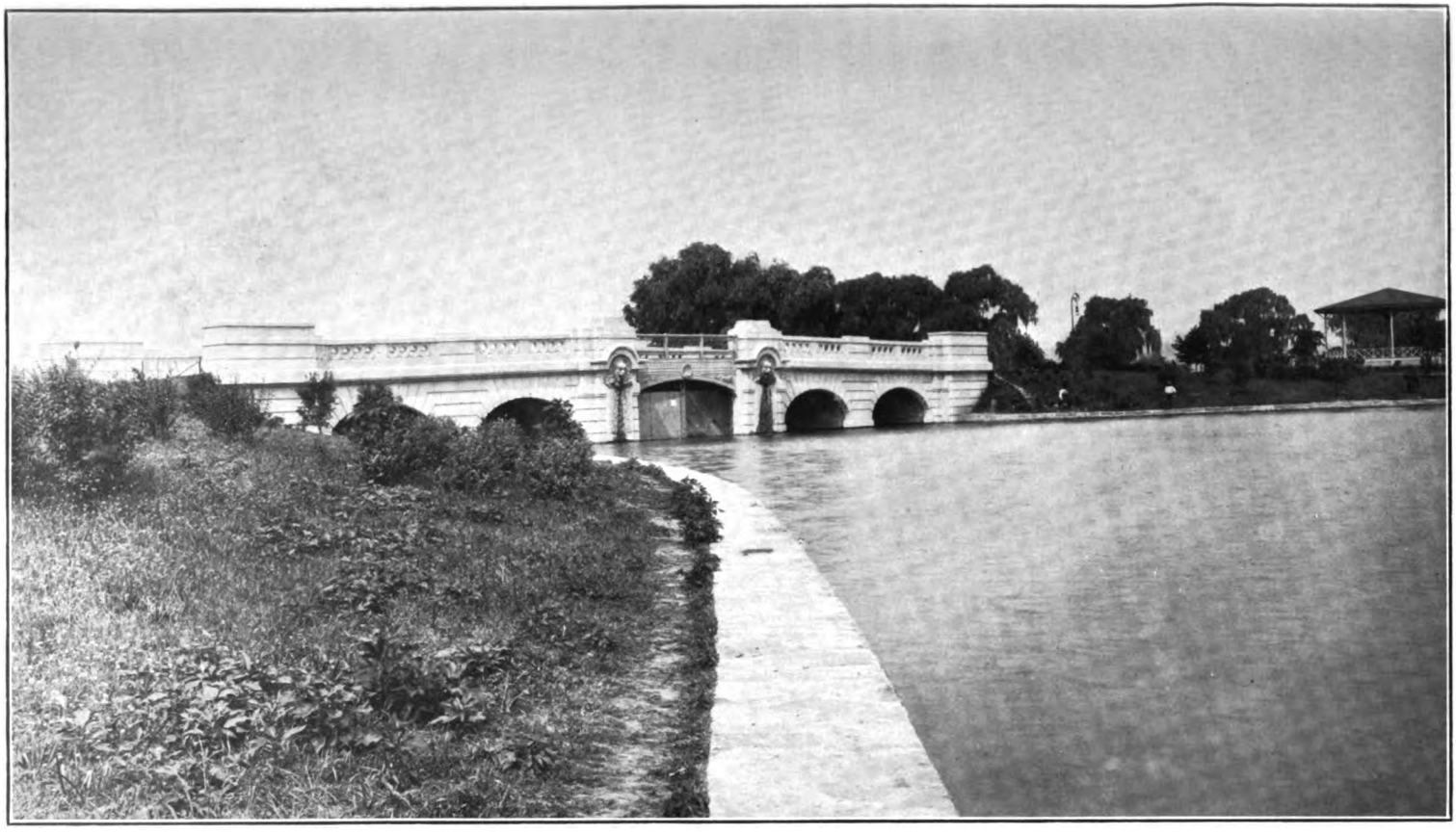

INLET BRIDGE, TIDAL BASIN, POTOMAC PARK. VIEW FROM THE EAST.

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Cinder bridle path, 12 feet wide, constructed	linear feet	2,110
Cinder foot path, 6 feet wide, constructed	do	1,975
1¼-inch galvanized iron water pipe, laid	feet	736
2-inch galvanized iron water pipe, laid	do	3,749
4-inch galvanized iron water pipe, laid	do	222
6-inch terra cotta drainpipe, laid	do	20
10-inch terra cotta drainpipe, laid	do	187
12-inch terra cotta drainpipe, laid	do	221
15-inch terra cotta drainpipe, laid	do	422

In constructing this roadway 6,000 gallons of water-gas tar and 6,000 gallons of heavy road oil were used as a binder between the 1-inch stone and the trap-rock screenings. Six thousand three hundred and sixty-six square yards of the portion between Eighteenth and Twenty-first streets that was constructed in the autumn of 1908 was oiled with an asphaltic oil.

Park roadway along B street north, from Virginia avenue to Fifteenth street west.—The sum of $10,000 was appropriated by Congress in sundry civil act approved March 4, 1909, for "continuing the southern half of north B street from Virginia avenue eastward to Fifteenth street west as a park roadway." Work under this appropriation was commenced in December, 1909. The paving blocks on the south half of the roadway and the flagstones of the south sidewalk were taken up and removed and the grade raised to conform to the grade of the portion of the roadway west of Virginia avenue. In this work 11,871 cubic yards of filling materials composed of clay, ashes, etc., were hauled in without expense to the United States and used. The grade of the entrance to Potomac Park at Seventeenth and B streets was raised for a distance of 150 feet south of B street to conform to the new grade. This necessitated the reconstruction of 870 square yards of the Seventeenth street roadway and the relaying of 280 feet of Telford block gutters, 2 feet wide. Before the grade of this roadway was raised the exterior walls of the old stone park lodge house at Seventeenth and B streets were plastered to a height of 3 feet above the old ground line with Portland cement mortar to guard against dampness in the building. A concrete area wall and eight concrete steps were constructed to lead down from the new grade to the north entrance to the house. The catch basin at the southwest corner of Seventeenth and B streets was raised 3 feet 6 inches, and three other basins between Sixteenth and Seventeenth streets were sealed up.

The following shows the work done in constructing this roadway:

Macadam driveway constructed	square yards	2,836
Vitrified brick gutter, 36 inches wide, laid	linear feet	1,116
Cement curb constructed	do	2,240
Concrete catch basins built		2
Area graded, soiled, and seeded	square yards	3,000
Cinder bridle path, 12 feet wide, constructed	linear feet	1,075
Flagged walk, 6 feet wide, laid	do	775
1¼-inch galvanized iron water pipe, laid	do	433
2-inch galvanized iron water pipe, laid	do	1,550
6-inch terra cotta drainpipe, laid	do	38
10-inch terra cotta drainpipe, laid	do	33
12-inch terra cotta drainpipe, laid	do	50

It was possible only to complete this road to Sixteenth street with the funds provided for the fiscal year 1910. It is expected, however, to finish it to Fifteenth street with the additional appropriation of $5,000, which has been granted for the fiscal year ending June 30, 1911.

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Monument grounds.—The work of filling up the old fish ponds south of B street between Sixteenth and Seventeenth streets was continued, the two nearest B street and adjacent to the Sixteenth street roadway having been completely filled in during the year. The material used in the filling, consisting of ashes and clay, was hauled into the grounds without expense to the United States. The total quantity of material thus received during the year was 54,722 cubic yards, making a total of 89,794 cubic yards which have been received since the filling was commenced in November, 1908. The lease granted by the Chief of Engineers June 26, 1907, to the Commissioners of the District of Columbia to use the fish ponds as bathing pools was revoked and a new lease executed June 24, 1910, granting them the use of a piece of ground between the ponds for establishing and maintaining bathing pools. One hundred and fifty-five feet of gutter was taken up and relaid in line; 41,903 square yards of macadam roadway were oiled and 2,450 square yards were reoiled. Twelve thousand seven hundred and thirty-three square yards of gravel road were covered with 1-inch trap rock and trap rock dust and thoroughly rolled. Five hundred square yards of macadam road were constructed on one of the old gravel roads, the gravel being utilized as a base. In this work about 800 gallons of heavy road oil were used. Eight hundred and forty-five square yards of cinder walks were covered with lime dust. A cinder bridle path was constructed between the new path over the outlet gates of the tidal reservoir and the bridle path in these grounds. Fifty cubic yards of stone and gravel were used in repairing the Sixteenth street roadway entrance. Marking stones were placed on the Potomac drive at the one-fourth, one-half, and three-fourths mile points in from Seventeenth and B streets. The water service was extended, 143 feet of 2-inch galvanized-iron pipe and 347 feet of 1¼-inch galvanized-iron pipe being used. Bids were opened May 20, 1910, for leasing the boathouse on the shore at the northeast corner of the tidal reservoir, and a lease executed by the Chief of Engineers on June 20, 1910, with the highest bidder.

The lodge house formerly occupied by the United States Fish Commission in the grounds on the east side of Seventeenth street south of B street was repaired. New sills were placed under all the exterior and interior walls; a new door was cut into the northwest corner room. Two water-closets were installed and 483 feet of 6-inch terra cotta pipe laid to connect them with the B street sewer. The old cement floors in all the rooms were taken up and new cement floors laid, and two new cement walks were constructed leading to the new water-closets. A new tin roof was placed on the building, and the ornamental iron guard on the roof was repaired. All the woodwork around the doors and windows and the baseboard around the rooms was repaired and given one coat of paint. The walls and woodwork were painted, and the entire exterior of the building was given two coats of paint. One hundred feet of privet hedge was planted along the entrance walks to the two water-closets. The closets were opened to the public in April, 1910.

4. WASHINGTON NATIONAL MONUMENT.

The usual care was taken to protect the shaft and keep it clean. The stairways, landings, railings, waiting rooms, marble walls on top floor and on landings, and the tablets in the interior walls were swept

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or otherwise cleaned. All machinery connected with the elevator was inspected, oiled, and cleaned each day before starting to carry passengers, and twice each week the safety appliances on the elevator car were tested, all by the employees at the monument. In addition to this, the elevator and all machinery connected with it were inspected once each month by an agent of the casualty company, with whom an agreement is in force for that service. The rooms in the power house and in the lodge house were regularly cleaned and kept in good order.

The doors, windows, and frames in the motor room were repaired and the woodwork in the room given two coats of lead and oil and two coats of enamel paint. The electrical machinery in the motor room and at the power house was kept in good order and the rooms were maintained in a cleanly condition.

At the power house a new stuffing box and piston rings were placed on the air pump and the pump put in perfect working order. The two boilers were opened at intervals during the year, cleaned, and maintained in good condition. Only one boiler is in service at a time, each being used alternately.

The roof of the lodge house and the flag pole were given two coats of paint. The heating boiler in the house was lowered and three steel I beams put in over it to carry an extension to the floor of the water-closet which is to be made. Heating, water, and sewer pipes were placed under these I beams. The rooms in the building were kept in neat condition.

The following table shows the number of visitors to the top of the Monument each month and the total during the year:

Month.	Number by the electric elevator.	Number by the stairway.	Total.
1909.			
July	11,238	976	12,214
August	17,910	1,990	19,900
September	14,908	1,933	16,841
October	13,466	1,233	14,699
November	8,522	934	9,456
December	7,416	952	8,368
1910.			
January	7,313	703	8,016
February	8,525	817	9,342
March	13,629	3,223	16,852
April	12,784	1,630	14,414
May	17,895	3,404	21,299
June	13,694	1,431	15,125
Total	147,300	19,226	166,526
Total, 1909	136,019	33,791	169,810
Yearly average 1888 to 1[illegible]	103,901	51,958	155,859
Yearly average 1898 to 1908	111,074	41,290	152,364

The Monument was opened to the public October 9, 1888. From that date to June 30, 1910, the total number of persons who ascended to the top was 3,408,676. The Monument is opened to the public every day except Sundays and legal holidays from 9 a. m. to 4 p. m. It was closed once from February 1 to May 31, 1901, to permit of the installation of a new electric power plant.

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Data relative to Washington Monument.

Height of cap above mean low water	596 feet 4¾ inches.
Height above doorsill	555 feet 5½ inches.
Side of base:	
Outside	55 feet 1½ inches.
Inside	25 feet.
Depth of foundation below doorsill (sand and clay)	38 feet.
Side of foundation	126 feet 6 inches.
Area of foundation	16,002.25 square feet.
Side of top:	
Outside	34 feet 6 inches.
Inside	31 feet 6 inches.
Walls, thickness:	
Base	15 feet ¼ inch.
Top	18 inches.
Weight of capstone	3,300 pounds.
Weight of whole Monument	81,120 tons.
Mean pressure at base	5 tons per square foot.
Pressure on foundation nowhere greater per square foot than	9 tons.
Near edges, less than	3 tons.
Taper of Monument	¼ inch to 1 foot.
Number of memorial stones (beginning at 30 feet, stopping at 280 feet)	179
Number of steps	898
Number of landings	50
Number of windows (at top only)	8
Cost	$1,300,000

Corner stone laid July 4, 1848.
Capstone set December 6, 1884.
Dedicated February 21, 1885.

Elevator (electric) time of travel	5 minutes.
Elevator, maximum load	35 persons.
Weight of car empty	5,670 pounds.
Weight of counterweight	8,040 pounds.

Speed of elevator, 100 feet per minute.
Engine governor throws off current at 105 feet speed per minute.
Car safety stops car at 150 feet speed per minute.
Elevator tested at 6 tons.

5. PROPAGATING GARDENS, INCLUDING GREENHOUSES AND NURSERY.

The various greenhouse structures were maintained in as good condition as the small appropriation would permit, and the plants were given necessary care and attention.

The superstructure of house No. 9 was entirely rebuilt with new material, including a new stoke hole, a new brick chimney, and a new boiler. Decayed woodwork in the other houses was replaced. All renewed work was painted and miscellaneous painting and color washing was done. Broken glass was replaced, and considerable work was done in reputtying old glass. The flues of boilers were cleaned, and heating pipes, water pipes, and boilers repaired. A large new boiler was installed for heating houses Nos. 21, 22, 23, 24, and 25. The stoke hole for house 25 was enlarged and a new brick chimney built for house No. 24. Two hundred and twenty feet of 3-inch wrought iron heating pipe was put in house 26. The entire exterior and the roof of the office building were painted two coats. Work was commenced in May, 1910, for reconstructing one of the greenhouses, and by June 30 the concrete walls for the substructure had been completed.

Two thousand Japanese cherry trees, presented to the city of Washington by the mayor and corporation of the city of Tokyo, Japan, were received on January 6. They were immediately examined by experts from the Department of Agriculture and found to be badly

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infested with a new borer and dangerous insects. The Secretary of Agriculture therefore recommended that they be destroyed. This recommendation was carried out by burning all the trees during the week ending January 22, 1910.

In the nursery grounds the lawns, roads, walks, and drains were cared for and the stock cultivated.

This office is frequently in receipt of requests for the loan or gift of plants from the gardens for the use of churches, fairs, festivals, etc., and for private purposes. All such requests have to be declined, as either the loan or gift of any plants would be in violation of the following extract from the act of Congress approved June 30, 1878:

Provided, That hereafter only such trees, shrubs, and plants shall be propagated at the greenhouses and nursery as are suitable for planting in the public reservations, to which purposes only the said productions of the greenhouses and nursery shall be applied.

The total number of plants propagated at the gardens was 680,420. Of these 636,637 were used for the reservations, the greenhouses, and the nursery under the charge of this office, and about 3,048 for other departments of the Government. The surplus remaining (about 20,735) were distributed to government and municipal offices, hospitals, public institutions, etc. The following list shows the stock grown, purchased, and distributed during the year:

Plants propagated and used for—	Number.	Kinds.	Number of varieties.
Park plantings	565,628	25	50
Stock, greenhouses, nursery, and fall plantings	67,009	22	275
Colonial gardens, White House	4,000	6	10
Grounds of Treasury Department	600	4	10
Grounds of State, War, and Navy Department	5,000	8	12
Grounds of United States Capitol	15,000	14	30
Grounds of Interior Department	500	1	2
Bureau of Engraving and Printing	1,858	12	15
Census Bureau	630	(a)	(a)
Washington Aqueduct	2,125	(a)	(a)
United States Navy-Yard	980	(a)	(a)
Bureau of American Republics	200	(a)	(a)
Washington Barracks	335	(a)	(a)
Post-Office, Station B	740	(a)	(a)
Jefferson Public School	1,200	(a)	(a)
No. 4 Truck Company, District of Columbia Fire Department	756	(a)	(a)
No. 6 Truck Company, District of Columbia Fire Department	1,000	(a)	(a)
No. 8 Engine Company, District of Columbia Fire Department	820	(a)	(a)
No. 12 Engine Company, District of Columbia Fire Department	250	(a)	(a)
No. 13 Engine Company, District of Columbia Fire Department	500	(a)	(a)
No. 18 Engine Company, District of Columbia Fire Department	736	(a)	(a)
No. 21 Engine Company, District of Columbia Fire Department	750	(a)	(a)
HOSPITALS AND INSTITUTIONS.			
Columbia Hospital	450	(a)	(a)
Providence Hospital	520	(a)	(a)
Naval Hospital	248	(a)	(a)
Sibley Memorial Hospital	224	(a)	(a)
Casualty Hospital	540	(a)	(a)
Emergency Hospital	516	(a)	(a)
Georgetown University Hospital	660	(a)	(a)
Children's Hospital	756	(a)	(a)
Garfield Memorial Hospital	708	(a)	(a)
Freedmen's Hospital	784	(a)	(a)
Homeopathic National Hospital	680	(a)	(a)
Corcoran Art Gallery	200	(a)	(a)
Flower and Fruit Guild	1,050	(a)	(a)
Home for the Aged and Infirm	661	(a)	(a)
Louise Home	680	(a)	(a)
Industrial Home School for Colored Children	740	(a)	(a)
Soldiers and Sailors Temporary Home	276	(a)	(a)
Total	680,420	.....	.....
PLANTS PURCHASED.			
Hardy flowering bulbs	32,000	4	16
Tender flowering bulbs	16,000	2	3
Trees	825	19	24
Shrubs	1,550	9	14

a General stock.

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The following data give a general idea of the work done during the year at the propagating gardens:

GROWN IN GREENHOUSES FOR SPRING, AUTUMN, AND WINTER BLOOM AND FOR DECORATIVE PURPOSES.

Chrysanthemums	4,300
Carnations	7,350
Roses	4,570
Poinsettias	500
Stevias	1,000
Violets	2,450
Tropical and decorative plants	6,000

PLANTED AT PROPAGATING GARDENS.

Antirrhinums	2,286
Asters	1,206
Calliopsis	1,062
Cannas	150
Coreopsis	655
Cosmos	1,000
Candytuft	100
Canterbury Bells	600
Dahlias	300
Gladiolli	1,000
Heliotrope	700
Marigolds	100
Poppies	180
Roses	1,500
Sweet Williams	800
Wall flowers	1,200

POTTED AND BOXED FOR WINTER FORCING.

Roman hyacinths	10,000
Narcissus	3,000
Lily of the Valley	3,000

PLANTED IN VARIOUS RESERVATIONS, INCLUDING WEST POTOMAC PARK.

Trees	1,335
Shrubs	2,503
Vines	40
Bulbs for spring bloom	32,000
Pansies for spring bloom	28,000
Bedding plants for summer decoration	559,628
Tropical plants for summer decoration	6,000
Vases stocked for summer decoration	15

Storehouses and shops, propagating gardens.—The tools, supplies, and other government property in the storehouse and shops were cared for. In the storehouse the roof was given one coat of paint and the underside of the roof and the trusses were given two coats. In the shops the roof was given two coats of paint, and one new 5-horsepower electric motor was installed to run the bench saw in the carpenter shop. The old 3-horsepower motor was taken out and stored.

Repairs were made to lawn mowers, wheelbarrows, and miscellaneous tools, edge tools sharpened and kept in good order, and new tools purchased from time to time as required.

A sale of old, unserviceable, and condemned materials and tools was held on March 24, 1909, and the gross proceeds thereof, amounting to $489.55, deposited in the Treasury of the United States. Of this amount $3.65 was for property belonging to the Highway Bridge.

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6. HOUSE NO. 516 TENTH STREET NW., WHERE ABRAHAM LINCOLN DIED.

This property was purchased by the United States in November, 1896, since which date it has been under the supervision of this office.

By authority of the Secretary of War, dated October 9, 1899, Mr. O. H. Oldroyd is allowed to occupy this building with his family as custodian, without pay, and to exhibit his Lincoln Museum, for which he charges a small entrance fee.

During the year repairs were made to the plumbing fixtures from time to time as required.

7. BUILDINGS OCCUPIED AS OFFICES BY THE WAR DEPARTMENT, EXCEPT STATE, WAR, AND NAVY DEPARTMENT BUILDING.

By order of the War Department, dated June 30, 1893, all buildings occupied as offices by the War Department, except the State, War, and Navy Department building, were placed under the charge of this office, so far as their preservation, care, and safety are concerned. During the year the buildings thus occupied were 12 in number, as follows:

Army Medical Museum and Library, Seventh and B streets SW.
Ford's Theater building, 509–511 Tenth street NW., Adjutant-General's Office.
No. 610 Seventeenth street NW., Adjutant-General's Office.
No. 532 Seventeenth street NW., office depot quartermaster.
No. 1725 F street NW., branch printing office, War Department.
No. 1712 G street NW., publication branch, Adjutant-General's Office.
No. 1744 G street NW., Division of Militia Affairs.
No. 1720 H street NW., Medical Dispensary.
Annex to Winder Building, Ordnance Department.
War Department stables, G street, between Seventeenth and Eighteenth streets NW.
Lemon Building, No. 1729 New York avenue NW., occupied by Supply Division, War Department, Office Public Buildings and Grounds, Signal Office, Post Paymaster, Drafting Division of the Quartermaster-General's Office, etc.
No. 1800 F street NW., occupied as an annex to the Insular Bureau of the War Department.

Monthly inspections were made of these buildings during the year, and they are believed to be in good and safe condition for the purposes for which they are being used.

8. DEPARTMENTAL TELEGRAPH LINE.

This is now an underground line, with about 18,950 feet of cable which is run in conduits owned by the Western Union Telegraph Company, the use of which is given the United States by law. The line starts from the Lemon Building, 1729 New York avenue NW., where the main storage operating battery is located, and runs overhead to the corner of Seventeenth and G streets NW., thence underground into the State, War, and Navy Department building, thence underground to the White House and Treasury Department, thence underground to Fourteenth and G streets NW., down Fourteenth to cable pole at southwest corner Fourteenth and B streets SW., and thence from cable pole along B street on Western Union overhead pole line to Department of Agriculture; returning from Department of Agriculture by overhead loop to cable pole at southwest corner of Fourteenth and B streets SW., and thence in underground

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cable loop to Pennsylvania avenue and E street NW. From this point the line extends by underground cable along E street, east to alley located between Thirteenth and Fourteenth streets into Department of Commerce and Labor, returning by loop in same cable to E street, thence along E street to Eleventh street, down Eleventh street to the Post-Office Department building, returning in same cable by loop over same route to E street, thence by underground cable along E street, east to Seventh street NW., thence along Seventh street into the Department of the Interior, returning by loop over same route to Seventh and E streets NW., and thence by underground cable along E street to North Capitol street, thence along North Capitol street to Government Printing Office, returning in same cable by loop over same route to E street, thence by underground cable along North Capitol street to United States Capitol building. From the Treasury Department there is an underground connection by cable up Fifteenth street to a pole in the alley between H and I streets, and from thence by aerial cable to the Department of Justice on K street near Fifteenth street. There are 14 local offices on the line, each having two circuits and two sets of instruments. Each office has a local battery, except the Interior Department, which has box instruments. The main battery in the Lemon Building consists of two sets of storage batteries of 50 cells each.

During the year the main battery and local batteries received necessary attention and were maintained in good working order. All crosses and other obstructions on the wires of the line were removed as soon as possible, instruments maintained in good condition, and necessary repairs made to wires.

The portion of the underground line between the Post-Office Department, the Interior Department, the Government Printing Office, and the Capitol was installed during the year, work having been commenced in August and completed in October, when this was finished.

The old pole lines running from Fourteenth and G streets NW. along G to Eighth street, along Eighth street to H street, along H street to North Capitol street, thence along North Capitol street to B street NW., were all removed, and all sidewalks along the route put in good condition. The telegraph office in the State Department was moved from room on second floor to room on first floor. The telegraph office in the Government Printing Office was moved to another location in the building.

After the adjournment of Congress in August, 1909, the instruments were removed from the tables of the Senate and House operators and stored during the recess. Upon the reassembling of Congress in December the instruments were replaced upon the tables and reconnected.

9. HIGHWAY BRIDGE ACROSS THE POTOMAC RIVER, DISTRICT OF COLUMBIA.

On September 12, 1908, the engineer officer in charge of the improvement of the Potomac River transferred to this office, by authority of the War Department, the highway bridge across the Potomac River, including the approaches on the Washington and Virginia shores, and the bridge over the Washington channel in the Washington approach.

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During the fiscal year the draw was opened 4,455 times for the passage of vessels, or an average of approximately 12.2 openings per day. The average cost of current was 8.8 cents per opening.

Current for operating the draw and lighting the bridge and the Washington approach was furnished by contract. Thirty-seven arc lights were maintained on the bridge during the year and 11 on the approach.

The Washington channel bridge was lighted under contract by incandescent gas lights of 60 candlepower.

The average daily travel over the bridge for seven consecutive days during June, 1910, was as follows:

Single cars, 95.4; trains of two cars each, 158.5; automobiles, 136.1; double teams, 1,614.7; single teams, 647.5; pedestrians, 853.5; equestrians, 14.6.

The work of painting the bridge, which was commenced on May 6, 1909, and was in progress at the close of that fiscal year, was continued during July, August, and September, and completed on the 21st day of the last-named month. All the iron work of the bridge was painted one coat. The downspouting and chimney cap on the draw house were repaired and the exterior of the house given one coat of paint. In May and June, 1910, the inside of the top cord and the inside of the end posts were painted with one coat of graphite. On the afternoon of March 1, 1910, the upstream end of the north abutment fender of the draw span was struck by a coal barge, breaking 7 piles and 4 pieces of Georgia pine timber. These were replaced with new piles and timber in May, 1910, by the owner of the barge without expense to the United States. Repairs were made to the asphalt pavement on the roadway of the bridge structure; the area resurfaced amounted to 55 square yards. The granitoid pavement on the approaches to the bridge was repaired in April, 1910, the area repaired amounting to 682 square yards. The work was done by the contractors who laid the pavement under the guaranty clause in their contract.

10. TREES, SHRUBS, PLANTS, FERTILIZERS, AND SKILLED LABOR FOR THE GROUNDS OF THE LIBRARY OF CONGRESS, THE CAPITOL, AND EXECUTIVE DEPARTMENTS.

Grounds of the Library of Congress.—The 4 large circular beds at the entrances to these grounds, which are planted with evergreens, were remodeled. There were taken from the stock of evergreens in Potomac Park, which were purchased for the Congressional Library, 200 large evergreens to complete this work.

The grounds on the east side and on a portion of the north side, which had settled from sewer connections and other similar work, were brought up to grade and sown with rye and grass seed. For this work 123½ cubic yards of surface soil were used, also 1 ton of bone meal, 3 bushels of Italian rye, 100 pounds of Kentucky blue grass, and 100 pounds of red top grass seed.

The shrubbery was all pruned.

Trenches were dug in the nursery at East Potomac Park last fall to receive the stock of evergreens purchased; these shrubs have been kept cultivated and watered.

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There were purchased:

600 evergreen shrubs.
100 pounds Kentucky blue grass seed.
100 pounds red top grass seed.
8 bushels of Italian rye seed.
1 ton bone meal.
123½ cubic yards surface soil.

Grounds of the Capitol.—During the summer and fall of 1909 the 56 flower beds and 18 vases on the Capitol terraces, around the Maltby building, and in the laboratory grounds were maintained in good condition. In October, 1909, the summer flowering plants were removed to their winter quarters at the propagating gardens. The beds were spaded and replanted with 8,800 bulbs and 1,300 dwarf evergreens, the 18 vases were filled with fresh compost and planted with 18 large evergreens. Of this number, 955 evergreens were purchased in the fall of 1909 and temporarily heeled in at Potomac Park nursery until they were used; the remaining 363 were taken from stock in the nursery which had been bought in previous years. There were also planted in the grounds 172 deciduous trees and shrubs taken from stock in our nursery specially bought for the Capitol grounds.

The two rectangular plots of ground on the east side of the House and Senate wings of the Capitol building were cleaned of weed growth, plowed, regraded, and sowed with winter rye and grass seed.

During the month of October the evergreen beds at the foot of the steps leading to the west entrance and the bed around the base of the Marshall statue were remodeled; the 250 evergreens used in the work were taken from stock in Potomac Park nursery purchased for the Capitol.

In the latter part of April of the present year such evergreens as had not been winter killed were removed from the vases and beds and transplanted to the nursery at East Potomac Park for future use. These beds were dug, vases refilled with fresh compost, and planted with 15,000 tropical and summer flowering plants. Three dozen water lilies were planted in the two fountain basins and 24 rhododendron maximum were planted in the court yard of the House of Representatives. The 200 vines purchased this spring are at the greenhouses and will be planted this summer.

There were purchased:

955 shrubs.
160 palms and other plants.
200 vines.
24 rhododendron maximum.
8 bushels grass seed.
6 bushels winter rye seed.
1 ton shredded cattle manure.
500 feet rubber hose, ¾-inch, garden.

Grounds of Executive Departments.—About 12,850 plants were furnished from the propagating gardens for improving the grounds of Executive Departments.

11. UNITED STATES WHARF PROPERTY, WASHINGTON, D. C.

By act of Congress approved March 3, 1899, the following-described property is placed under the immediate jurisdiction and control of the Chief of Engineers:

The banks of the Potomac River from the north line of the Arsenal grounds to the southern curb line of N street south. * * *

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By letter of March 11, 1899, from the office of the Chief of Engineers, this office was directed, as representative of the Chief of Engineers, to assume control of the said wharf line, which since that date has been in charge of this office. No work has been done during the year, as there are no funds available for either the improvement or care of the property.

The following-described leases, made by the Chief of Engineers, are now in force:

June 16, 1903, with Thomas R. Riley for wharf and building thereon at foot of Sixth street, opposite lot 13, square 503. Consideration, $50 per month, in advance.

September 2, 1903, with Thomas Banks for dock, wharf, and buildings, foot of Sixth street, opposite lot 14, in square 503. Consideration, $7.50 per month, in advance.

February 26, 1905, with Brig. Gen. Geo. E. Harries, commanding the District of Columbia National Guard, to erect and maintain a wharf opposite the foot of O street SW., for the use of the naval reserve of the District of Columbia Militia.

January 18, 1906, with Corinthian Yacht Club, land and water lot opposite lot 16, square 503, with right to erect a boathouse thereon. Consideration, $18.75 per quarter, in advance.

August 22, 1906, with Corinthian Yacht Club, for the use of two water lots on the river front opposite lots 17 and 18, in square 503, with the privilege of building wooden walk ways around three sides of the water lots, for fastening boats and gaining access to them. Consideration, $18.75 per quarter, in advance.

March 26, 1907, with George W. Webber, for the use of a wooden building on the south side of Water street, opposite lot 14, square 503, for use as a blacksmith and boiler-repair shop. Consideration, $5 per month, in advance.

February 11, 1909, with the Secretary of Commerce and Labor, to use and control an area at the intersection of O street and Water street SW., and to build and maintain thereon a wharf for the use of the United States Light-House Establishment.

The lease of July 13, 1903, with Edward Whyte, for wharf and building thereon between O and P streets, opposite lot 11, in square 504, was revoked on July 31, 1909, and the following issued in lieu thereof: September 23, 1909, with Edward Whyte, land and water lot opposite lots 9 and 10, in square 504, with the privilege of erecting a building thereon and to use said building for storing boats, etc. Consideration, $5 per month, in advance.

On July 6, 1910, upon the recommendation of this office the lease of December 27, 1907, with J. R. Lindsay, trustee, for the use of an existing wharf and the water area on the south side thereof at the foot of Sixth street, SW., opposite lot 14, square 503, was revoked by the Chief of Engineers, the lessee having failed to avail himself of the privileges granted by the lease but for a short period, and to fully perform the covenants of the lease.

On January 15, 1910, the Secretary of War granted the Navy Department permission for the temporary use of a wharf and land adjacent thereto near the foot of Twenty-sixth and B streets, NW., in Potomac Park for the United States Naval Medical School Hospital.

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12. MONUMENT AND WHARF AT WAKEFIELD, VA., THE BIRTHPLACE OF WASHINGTON.

The United States watchman in charge extended the usual care to this property, and during the growing season kept the grass cut around the monument. In May, 1910, the brush on the ground around the monument was cut and burned. In June, 1910, the iron fence around the monument was painted, and 78 linear feet of 12-inch terra cotta sewer pipe were laid across the roadway leading from the wharf to the monument to connect the drains of the farms on either side.

EXTENSION OF BUILDINGS BEYOND THE BUILDING LINES IN THE CITY OF WASHINGTON.

The act of Congress approved March 3, 1891, as amended by the act approved June 21, 1906, provides for the approval of the Secretary of War on applications for projections on buildings that are to be erected on lots adjoining United States public reservations.

By direction of the Secretary of War this office is charged with the duty of investigating and reporting upon these cases. During the fiscal year ending June 30, 1910, there were no applications of that character referred to this office by the War Department.

STATUES.

There are now 31 statues in the public grounds under the charge of this office, 1 in course of construction (that of Gen. Ulysses S. Grant), and 5 in contemplation—those of Von Steuben, Jefferson, Barry, Columbus, and John Paul Jones.

The two following statues were completed during the fiscal year, as described in detail in a subsequent part of this report:

Statue of General Count Pulaski. Erected in triangle at Pennsylvania avenue, Thirteenth and E streets, NW., cost $40,000. Sculptor, Kazimeirz Chodzinski; unveiled May 11, 1910.

Statue of Gen. Thaddeus Kosciuszko. Erected at the northeast corner of Lafayette Park. Presented to the Government by the Polish American Alliance and Polish-American people of the United States; sculptor, Antoni Popiel. Unveiled May 11, 1910.

Attention has been given to all the completed statues during the year, and the pedestals and bronze figures have been maintained in a cleanly condition as far as possible.

The status of the statues completed during the year, now under contract, or in contemplation, and the work accomplished during the year are as follows:

13. MEMORIAL TO GEN. ULYSSES S. GRANT.

The act of Congress approved February 23, 1901, created a commission composed of the President of the Society of the Army of the Tennessee, the Chairman of the Joint Committee on the Library, and the Secretary of War, to select a site and secure plans and designs for a statue or memorial of Gen. Ulysses S. Grant, not to exceed in

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cost the sum of $250,000. The act appropriated $10,000 to defray the expense of securing plans, specifications, and models. The sundry civil act approved June 28, 1902, appropriated $50,000 for commencing the erection of the memorial, and the sums of $40,000, $25,000, $42,000, and $35,000, respectively, were appropriated by the acts approved June 30, 1906, February 9, 1909, March 3, 1909, and June 25, 1910, for continuing the work.

On April 10, 1901, the commission issued an invitation for the submission of models, and in March, 1902, 27 models were submitted by 23 sculptors. Two of these models were selected for further competition. The final result was the selection of the design submitted by Henry Merwin Shrady, sculptor, and Edward Pearce Casey, architect, and a contract was entered into with them on August 10, 1903, for the production and erection of the memorial for the total sum of $240,000, the work to be completed within five years from date of contract.

The commission selected the unoccupied portion of the Botanic Garden grounds, between First and Second streets, as the site of the memorial, and their selection was approved by Congress in sundry civil act approved June 30, 1906.

On July 24, 1907, a supplemental contract was entered into making changes in the design of the memorial to better fit it to the site selected.

On October 7, 1907, the contractors began the work of excavating for the foundation. This was stopped two days later by an order from the supreme court of the District of Columbia directing the officer in charge of public buildings and grounds to show cause why he should not be enjoined from permitting trees in the Botanic Garden grounds being cut down for the purpose of erecting the memorial. In compliance with an order of the commission, the contractors were notified on October 19 that further work would not be permitted until further notice.

In April, 1908, by order of the commission, three historic trees on the site were moved to another location in the grounds, and on May 18, 1908, the work of constructing the foundation was resumed, and completed in July.

On July 29, 1908, the commission extended the date for completing the memorial for three years from August 10, 1908.

Work was commenced in August, 1908, on the construction of the marble superstructure, and completed by January 7, 1909. In the same month the four bronze lions designed for the memorial were erected. In March the ground around the memorial was cleared and rough graded. In April and June the 8 bronze lamp-posts were set in position.

The work remaining to be done for completing the memorial is as follows: Erecting upon the center pedestal the statue of General Grant and placing the two bas-reliefs on that pedestal, and erecting the bronze artillery group and the bronze cavalry group on the end pedestals. The quarter-size model of the bas-reliefs and all models of the artillery group have been approved by the commission.

The amount expended on the memorial to June 30, 1910, was $109,525.16.

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14. STATUE OF GENERAL VON STEUBEN.

The act of Congress approved February 27, 1903, appropriated the sum of $50,000 for procuring and erecting a statue of General von Steuben, and for the preparation of a site to be expended under the direction of a commission to be composed of the Secretary of War, the chairman of the Committee on the Library of the Senate, and the chairman of the Committee on the Library of the House of Representatives of the Fifty-seventh Congress.

In July, 1905, competition was invited for the statue, and six artists submitted models in October, one of the competitors submitting two models. In December, 1905, the commission selected three of the models as the most satisfactory and requested the three artists to submit larger models of their figures for final selection. Only two of the artists entered the second competition, from which a final selection was made in May, 1906, and on January 10, 1907, a contract was entered into by the commission with Mr. Albert Jaegers, the successful artist, for furnishing and erecting the monument, which is to be placed at the northwest corner of Lafayette Park. The working model of the statue was completed in May, 1907, and approved by the commisison.

In June, 1908, the model of one of the two bronze side groups was approved, and in December of the same year that for the second side group was approved. The full size model of the statue was approved September 1, 1909, and the bronze casting of it was received in Washington, on April 30, 1910, and stored at the storehouse of public building and grounds for safe-keeping until the pedestal is ready to receive it.

In June, 1910, the full size model of one of the two bronze side groups was approved and it is expected that the full size model of the second group will be completed by the sculptor in August, 1910.

The amount expended on the statue to date is $26,639.80.

15. STATUE OF COMMODORE JOHN BARRY.

Congress by act approved June 8, 1906, appropriated the sum of $50,000 for a statue to the memory of Commodore Barry, to be erected on ground belonging to the United States in this city. By direction of the statue commission, composed of the Secretary of War, the Secretary of the Navy, the chairman of the Committee on the Library of the Senate, and the chairman of the Committee on the Library of the House of Representatives, the officer in charge of public buildings and grounds, who is the executive and disbursing officer of the commission, prepared a programme of competition which was approved by the commission in April, 1908, and sent out to 25 American artists of Irish descent. It provided that models should be submitted between December 1 and 15, 1908, and in accordance therewith models were submitted by seven sculptors. The commission held a meeting and viewed the models, but made no selection. At the same meeting the commission decided to place the statue in the center of the west side of Franklin Park.

At a meeting held on February 25, 1909, the commission approved the report of a committee of three experts appointed by it, selecting three of the models as the most meritorious, and awarded prizes to

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the authors. Later the commission requested the author of the model awarded first prize to submit a new design, from which the architectural features of the model were to be omitted or made less prominent. This the artist consented to do, and his second model was received in this city in June, 1909.

After careful consideration the commission rejected this model as unsatisfactory, and invited Mr. John J. Boyle, of New York, to submit a model for the statue, a contract for the erection of the work to be awarded to him if the model proved satisfactory. His model was submitted in May, 1910, and viewed by a committee of experts, who recommended certain changes in the design of the monument. In the meantime, a permanent National Commission of Fine Arts having been created by Congress, the Barry Commission decided to refer the matter to them for advice.

The amount expended on account of this statue to June 30, 1910, was $2,935.86.

16. STATUE OF JOHN PAUL JONES.

Congress, by act approved June 8, 1906, appropriated the sum of $50,000 for the erection in the city of Washington of a statue to the memory of John Paul Jones and for the preparation of a site, and created a commission composed of the Secretary of War, the Secretary of the Navy, the chairman of the Committee on the Library of the Senate, and the chairman of the Committee on the Library of the House of Representatives, to direct the expenditure and to select a site for the statue on ground belonging to the Government other than the grounds of the Capitol or Library of Congress.

The commission in June, 1908, selected a sculptor, Mr. Charles H. Niehaus, to produce the statue. On December 16, 1908, a contract was entered into between the commission and the selected sculptor for the execution of the work. In April, 1909, the commission selected a site for the statue at the foot of Seventeenth street NW., on the shore at the northeast corner of the tidal basin.

On June 5, 1909, the sculptor submitted for consideration by the commission a model of the statue and pedestal, and at a meeting held on June 9 the commission approved the general design of the statue, but decided to ask the sculptor to restudy a portion of the pedestal. The revised model was approved and the detailed plans for the pedestal will be accepted as soon as some changes which have been agreed upon have been made.

The amount expended on account of this statue to June 30, 1910, was $33.02.

17. MEMORIAL TO CHRISTOPHER COLUMBUS.

By act approved March 4, 1907, Congress appropriated the sum of $100,000 for the erection in this city of a suitable memorial to Christopher Columbus, and created a commission consisting of the chairman of the Senate Committee on the Library of the Fifty-ninth Congress, the chairman of the Committee on the Library of the House of Representatives of the Fifty-ninth Congress, the Secretary of State, the Secretary of War, and the supreme knight of the Order of the Knights of Columbus, with authority to select a site and a suitable

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design and to contract for and superintend the construction of the memorial.

At a meeting held by the commission on May 18, 1907, the Secretary of War was elected chairman of the commission, and the officer in charge of public buildings and grounds its executive and disbursing officer.

On February 4, 1908, the commission selected as a site for the memorial the plaza in front of the new Union Railroad Station. On March 19, 1908, the commission accepted a design submitted by D. H. Burnham & Co., the architects of the Union Station, for the architectural treatment of the memorial, and on November 16, 1908, entered into contract with that firm for professional services in connection with the erection of the memorial. The commission directed its executive and disbursing officer to prepare a programme of competition for the sculpture proposed for the memorial. This was done, the programme printed, and copies were sent to all artists applying for it.

In accordance with the programme, 21 models were submitted by 20 competitors on or before December 1, 1908, and were placed on the fifth floor of the State, War, and Navy Department building. They were viewed by the commission on January 8, 1909, but no choice was then made. At its next meeting, held on February 25, the commission selected the model of Mr. Lorado Taft, and also awarded prizes to the authors of the two models placed second and third in order of merit. On March 4, 1910, a contract was entered into with Mr. Taft to furnish models for the sculptural work, exercise supervision over its execution in stone, and superintend its erection. The 1-inch scale model was finished in June, 1910, but its acceptance was postponed to enable some minor changes to be made.

The amount expended on account of this statue to June 30, 1910, was $3,495.95.

18. MONUMENT TO GEN. HUGH MERCER AT FREDERICKSBURG, VA.

This monument was erected in 1905–6 under authority contained in an act of Congress approved June 28, 1902, which appropriated the sum of $25,000 for the purpose. The act provided that the funds should be expended under the direction of the Secretary of War, the city of Fredericksburg to furnish the site. The sculptor is Mr. Edward V. Valentine, of Richmond, Va., who was selected by the Secretary of War to design and erect the monument. The work was done by Mr. Valentine under contract. The site for the monument was conveyed to the United States by the city of Fredericksburg in July, 1905. The erection of the monument was commenced in September, 1905, and completed in February, 1906. The grounds around the monument were improved by this office between April and June, 1906. The improvements consist of a grassed mound, inclosed with a granite coping, around the base of the pedestal, cement walks bordered by cement coping, grassed lawns, and a granite coping and an iron post and chain fence around the four sides of the site. Water pipe was also laid for irrigation purposes.

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19. DISTRICT OF COLUMBIA ARMORY COMMISSION.

Section 17 of the public buildings act approved May 30, 1908, created a commission consisting of the Assistant Secretary of War, the general commanding the militia of the District of Columbia, the officer in charge of public buildings and grounds, at Washington, D. C., and the Superintendent of the United States Capitol Building and Grounds, "Which shall cause plans and estimates to be prepared for a suitable armory for the National Guard of the District of Columbia and report the estimated cost thereof to the Congress." The act provided that the plans and estimates be prepared under the supervision of the Secretary of the Treasury and appropriated $2,500 for the expenses of the commission.

The commission selected the firm of Tracy, Swartwout & Litchfield, of New York, to prepare the plans and estimates. These were approved by the Supervising Architect of the Treasury, who was designated by the Secretary of the Treasury to supervise their preparation, as required by the act, and were then submitted by the commission, with its report, to Congress on April 13, 1910.

20. COMMISSION OF FINE ARTS.

By act approved May 17, 1910, Congress created a permanent Commission of Fine Arts, the constitution and duties of which were defined by the act which reads as follows:

That a permanent Commission of Fine Arts is hereby created to be composed of seven well-qualified judges of the fine arts, who shall be appointed by the President, and shall serve for a period of four years each, and until their successors are appointed and qualified. The President shall have authority to fill all vacancies. It shall be the duty of such commission to advise upon the location of statues, fountains, and monuments in the public squares, streets, and parks in the District of Columbia, and upon the selection of models for statues, fountains, and monuments erected under the authority of the United States and upon the selection of artists for the execution of the same. It shall be the duty of the officers charged by law to determine such questions in each case to call for such advice. The foregoing provisions of this act shall not apply to the Capitol building of the United States and the building of the Library of Congress. The commission shall also advise generally upon questions of art when required to do so by the President, or by any committee of either House of Congress. Said commission shall have a secretary and such other assistance as the commission may authorize, and the members of the commission shall each be paid actual expenses in going to and returning from Washington to attend the meetings of said commission and while attending the same.

SEC. 2. That to meet the expenses made necessary by this act an expenditure of not exceeding ten thousand dollars a year is hereby authorized.

Pursuant to the authority conveyed by the act the President, on June 15, 1910, appointed the following-named gentlemen to be members of the commission:

D. H. Burnham, Chicago, Ill.
Frederick Law Olmsted, jr., Brookline, Mass.
Thomas Hastings, New York City.
Daniel C. French, New York City.
Francis D. Millet, Washington, D. C.
Cass Gilbert, New York City.
Charles Moore, Detroit, Mich.,

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and on June 17, 1910, appointed Col. Spencer Cosby, the officer in charge of public buildings and grounds, secretary of the commission.

Subsequently, in sundry civil act approved June 25, 1910, Congress provided as follows:

To meet the expenses made necessary by the act approved May 17, 1910, entitled "An act establishing a Commission of Fine Arts," to be disbursed by the officer in charge of public buildings and grounds, on vouchers approved by the commission, who shall be the secretary and shall act as the executive officer of said commission, ten thousand dollars.

STATUE OF THOMAS JEFFERSON.

The sundry civil act approved April 28, 1904, created a commission composed of the Secretary of State, the chairman of the Committee on the Library of the Senate, and the Chairman of the Committee on the Library of the House of Representatives of the Fifty-eighth Congress to select a site on the public grounds of the District of Columbia for a statute of Thomas Jefferson and appropriated the sum of $5,000 to procure plans for the same. At the request of the Secretary of State, the officer in charge of this office is to act as executive and disbursing officer of the commission.

On December 29, 1909, this office wrote a letter to the Secretary of the Treasury inviting attention to a decision of the Comptroller of the Treasury dated December 16, 1909, that the appropriation of $5,000 for plans for this statue should be covered into the Treasury under the provisions of section 10 of sundry civil act approved March 4, 1909.

No expenditures have been made from the appropriation, nor have any liabilities against it been incurred at any time.

STATUE OF GENERAL COUNT PULASKI.

By act of Congress approved February 27, 1903, the sum of $50,000 was appropriated for this statue, to be expended under the direction of the Secretary of War, the chairman of the Committee on the Library of the Senate, the chairman of the Committee on the Library of the House of Representatives, and the president of the Pulaski Monument Polish Central Committee. The commission selected as a site for the statue United States reservation No. 33, Pennsylvania avenue, Thirteenth, and E streets NW.

By invitation of the commission a model was submitted in March, 1905, by Kazimierz Chodzinski, a Polish-American sculptor. The model was not satisfactory to the commission and was rejected, and the artist was paid on April 25 the sum agreed upon as a compensation for his services.

In January, 1906, the commission by resolution decided to permit Mr. Chodzinski to submit another model for their consideration. This second model was submitted by him on February 9, 1907, and after some delay was finally accepted by the commission, which, on February 19, 1908, entered into a contract with the sculptor for the production and erection of the work within two and one-half years. In April, 1909, an agent of the commission made an inspection of the full-size model in Mr. Chodzinski's studio. He reported it well advanced and satisfactory, and a payment on account was made the

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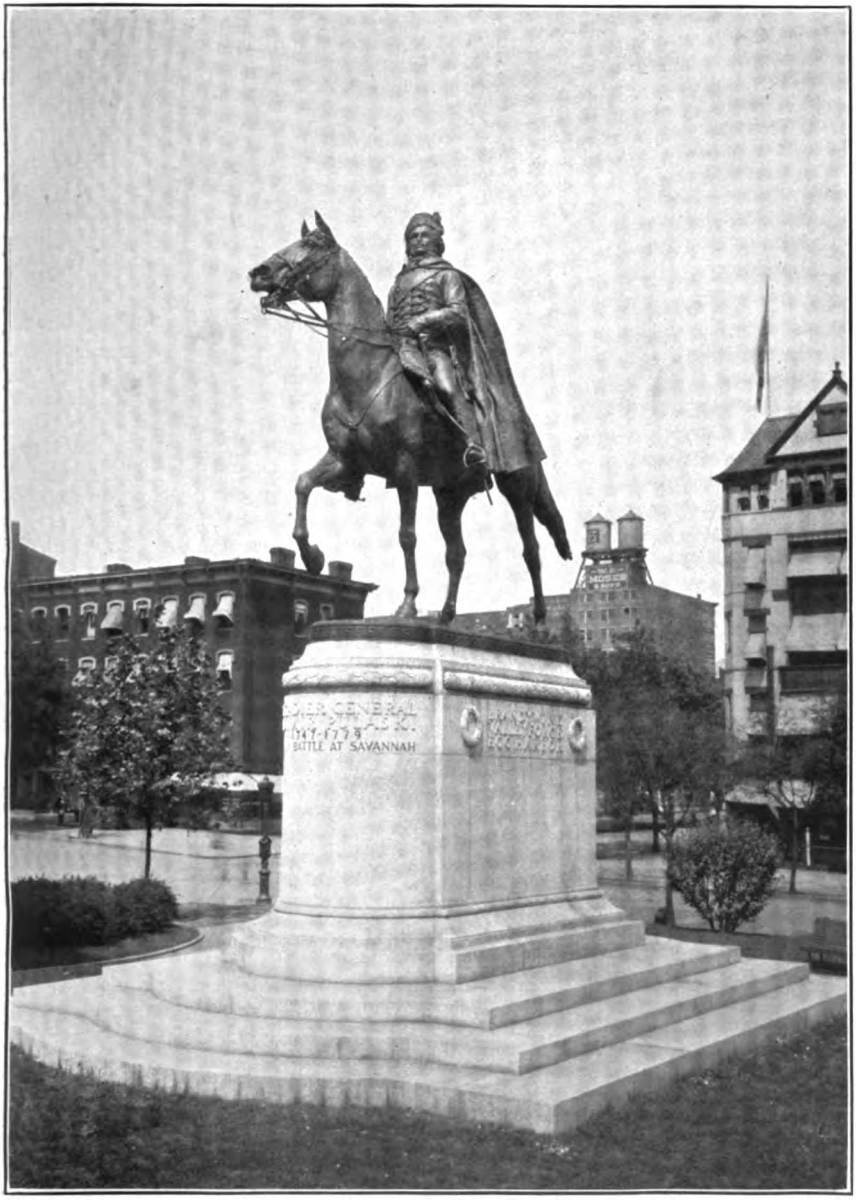

VIEW OF THE PULASKI MONUMENT, PENNSYLVANIA AVENUE AND THIRTEENTH STREET NW., LOOKING NORTHEAST.

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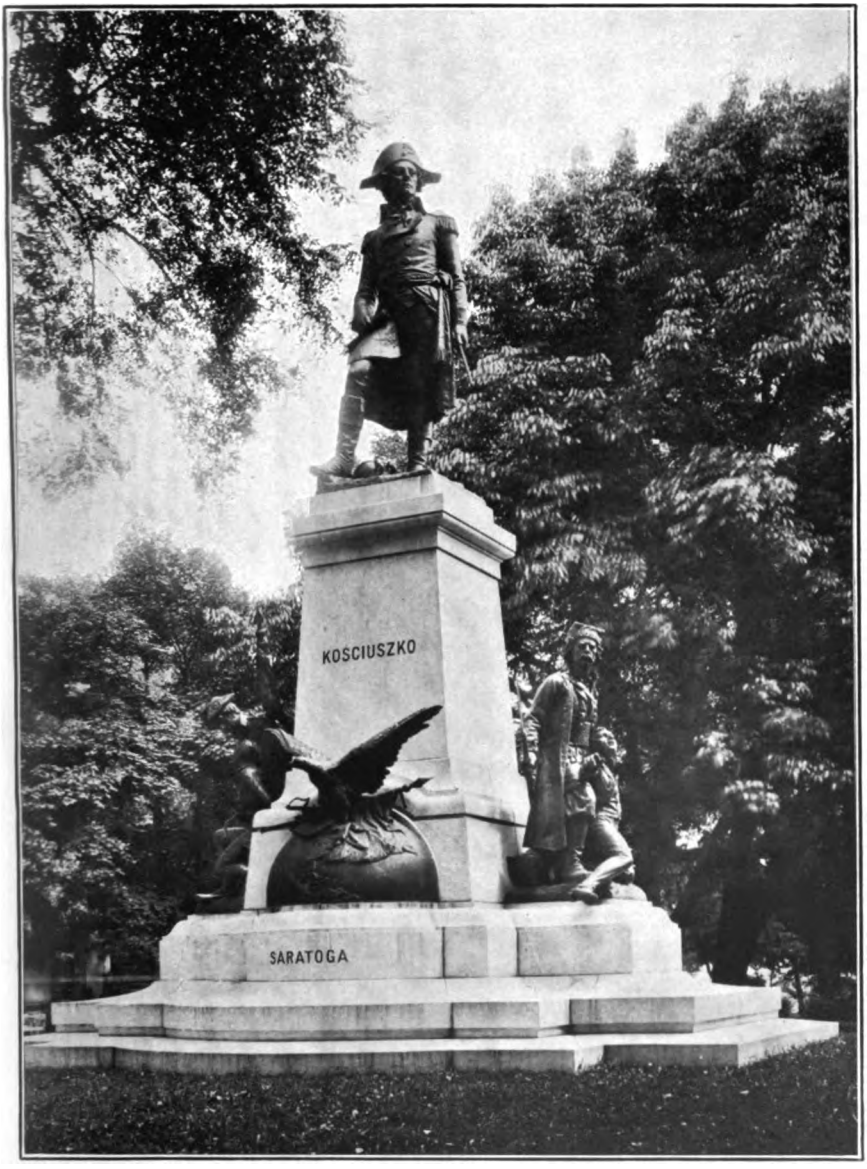

VIEW OF THE KOSCIUSZKO MONUMENT, NORTHEAST CORNER OF LAFAYETTE PARK AND MADISON PLACE, LOOKING SOUTHEAST.

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sculptor May 27. The model was completed and accepted on December 8, 1909; while the statue was being cast in bronze at the works of the Gorham Manufacturing Company the pedestal was erected on the selected site. The statue was placed in position on May 7, and on May 11 was dedicated with imposing ceremonies. For these ceremonies three viewing stands were erected, and the other necessary preparations, such as issuing invitations, tickets for seats, etc., were made by this office. The stands were taken down after the ceremonies.

The cost of the monument proper was $40,000. A photograph of the completed monument accompanies this report.

To defray the expenses of the unveiling and for preparing site, improving grounds around the monument, etc., Congress appropriated the sum of $5,000 in the urgent deficiency act approved February 25, 1910. Work for preparing and improving the site was commenced in March and completed in May. The grade of the site was raised, a sodded mound, inclosed with a granite coping, constructed around the base of the pedestal, new asphalt walks, bordered with low cement coping, laid, and the lawn surfaces resodded.

STATUE OF GEN. THADDEUS KOSCIUSZKO.

The joint resolution of Congress approved April 18, 1904, accepted the offer of the Polish-American organizations and the Polish-American people of the United States generally to present a statue of General Kosciuszko, to be erected in the northeast corner of Lafayette Park.

The committee representing those organizations invited competition for the statue, and models were received in Washington in December, 1906, from the artists who entered the competition. The commission which the joint resolution provided should approve the statue on behalf of the United States viewed the models, recommended that the one submitted by Mr. Antoni Popiel be accepted, and that recommendation was approved by the committee mentioned, who contracted for the erection of the statue and pedestal by April 15, 1910.

Work for the erection of the statue and pedestal was commenced on March 3, 1910, and completed April 30.

In urgent deficiency act approved February 25, 1910, Congress appropriated the sum of $3,500 for preparing and improving the site and unveiling the statue. The improvements were made in April and May. They consisted of the construction of a grassed mound, inclosed with a granite coping, around the base of the pedestal, constructing asphalt walks around the statue, erecting granite coping and posts at the entrance to the walks, and grading, soiling, and sodding the lawn adjoining the walks.

The statue was unveiled on May 11, 1910, the ceremonies immediately following those at the unveiling of the statue of General Pulaski, the preparations for the unveiling—such as the erection of stands, issuing invitations, etc.—being similar to those made for that statue.

A photograph of the monument as completed accompanies this report.

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RESERVATIONS WHICH ARE THE PROPERTY OF THE UNITED STATES OCCUPIED, IT IS BELIEVED, IN VIOLATION OF LAW.

[See map in Annual Report for 1894.]

The following reservations, the property of the United States, are now occupied, it is believed, without authority of law:

Reservation No. 186 by the Bethany Chapel of the New York Avenue Presbyterian Congregation.

Reservations Nos. 137, 152, and 164 have been inclosed with iron or wire fences and partially improved by the owners of adjacent property.

The following also are improved and utilized by adjacent property owners: Nos. 61, 65, 67, 139, 141, 142, 161, and 175.

Reservations 61, 141, and 142, above mentioned, are occupied under permits granted the owners of the adjacent property by the Chief of Engineers, under authority of the act of Congress approved July 1, 1898.

Preliminary steps have been taken during the past year with a view to obtaining possession of the others of the above reservations, or, if deemed advisable, recommendation will be made that permits for their occupancy be issued by the Chief of Engineers.

In addition to the foregoing, there is a valuable piece of United States grounds, known as reservation No. 94a, lying between Rock Creek and Twenty-eighth street west, between I and K streets north, of which certain persons are now in unlawful occupation. This office has for several years been making efforts to secure possession of the property, which have so far proved unsuccessful. In December, 1909, this matter was again brought to the attention of the United States attorney for the District of Columbia, and from information received from the Department of Justice it is believed that it will soon be decided in the courts.

DISTRIBUTION OF EXPENDITURES.

The following summary shows in tabulated form the various expenditures and liabilities incurred during the fiscal year for each separate work under the charge of this office:

Work.	Expenditures and liabilities.
General office expenses	$11,400.00
Improvement and care of parks, including the propagating gardens	209,320.00
Care and repair of Executive Mansion, grounds, and greenhouses	78,040.00
Improvement and maintenance of telegraph line connecting the Capitol with Executive Departments	4,000.00
Furnishing trees and plants for grounds of Executive Departments, Library of Congress, and Capitol	5,000.00
Care and maintenance of Washington Monument	11,624.00
Maintenance of Highway Bridge across the Potomac River	16,000.00
House where Abraham Lincoln died	1.12
Monument at birthplace of Washington, Wakefield, Va	400.00
Memorial to Gen. Ulysses S. Grant	4,056.15
Statue of General von Steuben	12,116.90
Monument to Commodore John Barry	1,403.90
Monument to John Paul Jones	1.10
Memorial to Christopher Columbus	515.05
Monument to Gen. Count Pulaski	41,385.11
Unveiling statues of General Pulaski and General Kosciusko	7,752.83
Total	402,856.16

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Estimates for the fiscal year ending June 30, 1912.

Salaries of employees, public buildings and grounds:		
1 assistant engineer	$3,000	
Assistant and chief clerk	2,400	
1 clerk of class 4	1,800	
1 clerk of class 3	1,600	
Clerk and stenographer	1,400	
1 clerk of class 1	1,200	
1 messenger	840	
Landscape architect	2,400	
Surveyor and draftsman	1,500	
Foremen, gardeners, mechanics, and laborers employed in public grounds	31,200	
1 sergeant of park watchmen	950	
1 second sergeant of park watchmen	900	
For day watchmen, as follows: One in Franklin Park and adjacent reservations on New York avenue; 1 in Lafayette Park; 2 in Smithsonian grounds and neighboring reservations; 1 in Judiciary Park; 1 in Lincoln Park and adjacent reservations; 1 in Iowa Circle and reservations to the northwest; 1 in Thomas and Scott circles and neighboring reservations; 1 in Washington Circle and neighboring reservations; 1 in Dupont Circle and neighboring reservations; 1 in McPherson Park and Farragut Square; 1 in Stanton Park and neighboring reservations; 2 in Henry and Seaton parks and neighboring reservations; 1 in Mount Vernon Park and reservations to the northeast; 1 in grounds south of the Executive Mansion; 1 in Garfield and Marion parks and reservations to the east; 1 in Monument Park; and 3 in Potomac Park; 21 in all, at $720 each	15,120	
For night watchmen as follows: Two in Smithsonian grounds and neighboring reservations; 1 in Judiciary Park; 2 in Henry and Seaton parks and adjacent reservations; 1 in grounds south of the Executive Mansion; 1 in Monument Park; 1 in Garfield Park and neighboring reservations; 1 in Iowa, Scott, and Thomas circles and neighboring reservations; 1 in Stanton and Lincoln parks and neighboring reservations; 1 in Lafayette and McPherson squares and Franklin and Farragut parks; 1 in Washington and Dupont circles and neighboring reservations; 1 in Mount Vernon Park and neighboring reservations; 2 for greenhouses and nursery; and 4 in Potomac Park; 19 in all, at $720 each	13,680	
For watchman for the care of the monument and dock at Wakefield, Va., the birthplace of Washington	300	
		$78,290
Contingent expenses, public buildings and grounds:		
For contingent and incidental expenses, including purchase of professional and scientific books and periodicals, books of reference, blank books, photographs, and maps	700	
For purchase and repair of bicycles and revolvers for park watchmen and for purchase of ammunition	1,000	
For purchasing and supplying uniforms to park, Monument, and bridge watchmen	2,800	
For purchase of steel fireproof cases for old records in office of public buildings and grounds	800	
		5,300
Improvement and care of public grounds, District of Columbia:		
Improvement and maintenance of grounds south of Executive Mansion	4,000	
Ordinary care of greenhouses and nursery	2,000	
Repair and reconstruction of greenhouses at the nursery	3,000	
Ordinary care of Lafayette Park	2,000	
Ordinary care of Franklin Park	1,500	
Improvement and ordinary care of Lincoln Park	2,000	

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Improvement and care of public grounds, etc.—Continued.		
Care and improvement of Monument grounds and annex (Potomac Park) to Monument grounds	$7,000	
Improvement, care, and maintenance of Garfield Park	2,500	
Construction and repair of post-and-chain fences, repair of high iron fences; constructing stone coping about reservation; painting watchmen's lodges, iron fences, vases, lamps, and lamp-posts; repairing and extending water pipes and purchase of apparatus for cleaning them; hose, manure, and hauling the same; removing snow and ice; purchase and repair of seats and tools; trees, tree and plant stakes, labels, lime, whitewashing, and stock for nursery, flower pots, twine, baskets, wire, splints, moss, and lycopodium to be purchased by contract or otherwise, as the Secretary of War may determine; care, construction, and repair of fountains; abating nuisances; cleaning statues and repairing pedestals	18,550	
For improvement, care, and maintenance of various reservations, including purchase, maintenance, and driving of horse and vehicle for official use of the officer in charge of public buildings and grounds, and of other necessary vehicles for official use	30,000	
For improvement, care, and maintenance of Smithsonian grounds	3,000	
For improvement and maintenance of Judiciary Park	2,500	
For laying cement and other walks in various reservations	2,000	
For broken stone road covering for parks	3,500	
For curbing, coping, and flagging for park roads and walks	2,000	
For care and maintenance of Potomac Park	15,000	
For grading, soiling, seeding, and planting that portion of Potomac Park west of the railroad embankment, and constructing roads and paths, and completing inlet bridge	100,000	
For oiling macadam roads	5,000	
For constructing a park lodge in Potomac Park	5,000	
For commencing the improvement of the portion of Potomac Park east of the railroad embankment	25,000	
For laying cement pavement on the sidewalks on East and West Executive avenues, and south of the Treasury Department building	6,000	
For grading and improving the portions of Seaton Park bordering Sixth street NW	5,000	
For one ornamental fountain in reservation 36, at Pennsylvania avenue and Eighth street NW	3,000	
For completing the improvement of the terrace of reservation 57c on Twenty-second street, between Decatur and S streets NW	3,000	
		$252,550
Improvement and care of public grounds:		
For improvement, care, and maintenance of grounds of executive departments	1,000	
For such trees, shrubs, plants, fertilizers, and skilled labor for the grounds of the Library of Congress as may be requested by the superintendent of the library building	1,000	
For such trees, shrubs, plants, fertilizers, and skilled labor for the grounds of the Capitol and the Senate and House Office buildings as may be requested by the Superintendent of the Capitol Building	4,000	
For improvement and maintenance of Executive Mansion grounds (within iron fence)	5,000	
For the employment of an engineer by the officer in charge of public buildings and grounds	2,400	
For the purchase and repair of machinery and tools for shops at nursery, and for the repair of shops and storehouse	1,000	
		14,400

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Repairs, fuel, etc., Executive Mansion:
For ordinary care, repair, and refurnishing of the Executive Mansion, and for the purchase, maintenance, and driving of horses and vehicles for official purposes, to be expended by contract or otherwise, as the President may determine $35,000
For fuel for the Executive Mansion, greenhouses, and stable 6,000
For care and maintenance of greenhouses, Executive Mansion 9,000
For repairs to greenhouses, Executive Mansion 3,000
$53,000

Lighting, etc., Executive Mansion, etc.:
For gas, electricity, pay of lamplighters, gas fitters, and laborers; purchase, erection, and repair of lamps and lamp-posts; purchase of matches, and repairs of all kinds; stoves, fuel, and lights for office and office stable, watchmen's lodges, and for the greenhouses at the nursery: *Provided*, That for each 5-foot burner not connected with a meter in the lamps on the public grounds not more than $18 shall be paid per lamp for gas, including lighting, cleaning, and keeping the lamps in repair, under any expenditure provided for in this act, and said lamps shall burn every night on the average from fifteen minutes after sunset to forty-five minutes before sunrise; and authority is hereby given to substitute other illuminating material for the same or less price, and to use so much of the sum hereby appropriated as may be necessary for that purpose: *Provided further*, That $4,700 of the foregoing sum shall be paid from the revenues of the District of Columbia and the remainder from the Treasury of the United States: *And provided further*, That not more than $6,000 of said appropriation may be expended for lighting, extinguishing, cleaning, repairing, and painting park lamps of a higher candlepower than those provided for above and not less than 60 candlepower, which lamps shall cost not to exceed $20.85 per lamp per annum, and shall otherwise be subject to the restrictions of this paragraph 17,000
For lighting 6 arc electric lights in the Executive Mansion grounds within the iron fence, at not exceeding $85 per light per annum, which sum shall cover the entire cost of lighting and maintaining in good order each of said lights 510
For lighting 6 arc electric lights at the propagating gardens, at not exceeding $85 per light per annum, which sum shall cover the entire cost of lighting and maintaining in good order each of said lights 510
18,020

Lighting public grounds, District of Columbia:
For lighting arc lights in the public grounds, as follows: For 7 in the grounds south of the Executive Mansion; 32 in Lafayette, Franklin, Judiciary, and Lincoln parks; 14 in grounds south of the Executive Mansion and in Monument Park; and 67 on Potomac Park driveways, 120 in all, at not exceeding $85 per light per annum, which sum shall cover the entire cost of lighting and maintaining in good order each of said lights (one-half of which sum shall be paid from the revenues of the District of Columbia and the other half from the Treasury of the United States), in all 10,200
Telegraph to connect the Capitol with the departments and Government Printing Office:
For care and repair of existing lines 500
348,670

Grant Memorial:
For completing work for the erection of the memorial to Gen. Ulysses S. Grant 48,000

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Care and maintenance of Washington Monument:
For the care and maintenance of the Washington Monument, namely—

1 custodian, at $100 per month	$1,200	
1 steam engineer, at $80 per month	960	
1 assistant steam engineer, at $70 per month	840	
1 fireman, at $55 per month	660	
1 assistant fireman, at $55 per month	660	
1 conductor of elevator car, at $75 per month	900	
1 attendant on floor, at $60 per month	720	
1 attendant on top floor, at $60 per month	720	
8 night and day watchmen, at $60 per month	2,160	
	8,820	
For fuel, lights, oil, waste, packing, tools, matches, paint, brushes, brooms, lanterns, rope, nails, screws, lead, electric lights, heating apparatus, oil stoves for elevator car and upper and lower floors, repairs to engines, boilers, dynamos, elevator, and repairs of all kinds connected with the monument and machinery, and purchase of all necessary articles for keeping the monument, machinery, elevator, and electric plant in good order	3,000	
		$11,820

Repairs to building where Abraham Lincoln died:
For painting and miscellaneous repairs 200

Improvements, Wakefield, Va.:
For repairs to fences and cleaning up and maintaining grounds around the monument 100

Commission of Fine Arts:
To meet the expenses made necessary by the act approved May 17, 1910, entitled "An act establishing a Commission of Fine Arts," to be disbursed by the officer in charge of public buildings and grounds, on vouchers approved by the commission 10,000

Highway Bridge across Potomac River, D. C.:
For salaries of—

2 draw operators, at $1,020 each	$2,040	
1 draw operator	720	
4 watchmen, at $600 each	2,400	
Labor	1,500	
For lighting, power, and miscellaneous supplies, and expenses of every kind necessarily incident to the operation and maintenance of the bridge and approaches	9,340	
		16,000

The details of the estimate for Highway Bridge are as follows:

Salaries:	
2 draw operators, at $1,020 each	2,040
1 draw operator	720
4 watchmen, at $600 each	2,400
Labor for cleaning roadway, etc	1,500
Total for regular services	6,660
Current for operating 6,000 openings, at 9 cents each	540
Lighting 48 arc lights, at $85 per annum each	4,080
Lighting 20 gas burners, at $20.85 per annum each	417
Telephone service	63
Fuel for heating operating house	65
Miscellaneous supplies (grease, oil, waste, etc.)	375
Painting and repairs	3,300
Contingencies (additional labor, etc.)	500
Total	16,000

As some of the preceding estimates are larger than amounts heretofore appropriated, and as some of them are new, the following explanations thereof are submitted:

1. An increase in the pay of the assistant engineer has been recommended from $2,400 to $3,000 per annum. The present compensation

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of this position is not adequate for the duties and responsibilities involved, which have been greatly increased since this rate was fixed. The assistant engineer superintends the work of the large force of foremen, mechanics, and laborers employed in the care of the parks and in the prosecution of new work on them, and upon him devolves the preparation of estimates and specifications for that work. He is in charge of the force of mechanics and laborers at the White House, and supervises the work for the repair, betterment, and refurnishing of that building. He has immediate charge of the Highway Bridge and its approaches and of the Washington Monument, and of all work connected with their maintenance, repair, and improvement. He supervises all the work of erecting statues, and makes monthly inspections of the buildings, 12 in number, occupied as offices by the War Department, other than the State, War, and Navy Departments building, so far as their preservation, care, and safety are concerned. An engineer of experience, judgment, and ability is needed to perform these multifarious duties in such a manner that the work shall be efficiently and economically done, and he should be paid the value of his services. The present incumbent fulfills these requirements in every respect. There is no doubt that a private firm or a corporation would pay more than $3,000 per annum to an employee of his capability and having his responsibilities. In fact, he has been offered that salary by a private concern, and there seems no good reason why the Government should pay less.

2. An additional clerk at $1,200 is asked for. The office force at present consists of 1 chief clerk, 3 clerks, and 1 messenger.

No addition to this number has been made during the past nine years, while many additional duties have been assigned to the office during that period and its regular work has been largely increased.

Some of the added duties are the erection of the Grant and Columbus memorials; the supervision, inspection, and erection of 7 statues; supervising the erection of 5 monuments; the maintenance and operation of the Highway Bridge across the Potomac, and its approaches; the bridge across the inlet to the tidal reservoir; and the making of an inventory of the White House property. The office has also been given charge of about one-half the area (300 acres) of Potomac Park, while the number of reservations used as parks has been increased by 18.

It has been possible to perform the resulting increased clerical work only by requiring the force to work after hours, the record showing that between January 1 and June 14, 1910 alone, 1,435 hours, equaling 205 days of 7 hours each, of overtime were put in. In addition to this, it was found necessary, in order to prevent the work from getting too far in arrears, to utilize the messenger as a coypist, and during the summer to bring a timekeeper into the office for three months.

In order that the office work may be promptly and properly done within the regular hours of duty prescribed by law and regulations, an additional clerk is absolutely necessary.

3. An increase for this year only of $600 is asked for in the item "for purchase and repair of bicycles and revolvers for park watchmen and purchase of ammunition."

Of the increased amount the sum of $340 is asked for to purchase 10 bicycles and 1 speedometer. It is considered absolutely neces-

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sary that 20 of the park watchmen should have bicycles, as the beats covered by these men are of such a length that a man on foot would find it impossible to perform properly his duty in protecting the parks and reservations assigned to him. A park watchman on a bicycle is twice as efficient as one on foot. There are at present 19 bicycles available for the use of the park watchmen. Of this number, 1 is new; 1 has been in service one year; 7 two years; 7 three years; 1 four years; 1 five years; and 1 six years. The $300 appropriated prior to this year for the purchase and repair of bicycles has been barely enough to keep the machines in use in proper repair, and only by the strictest economy has it been found possible to purchase 1 new bicycle each year. The increase of $100 this year will probably allow not more than 2 new bicycles to be bought as the bicycles being older will require more repairs. By the end of the year it is estimated that 10 of them will be beyond repair and will have to be replaced by new machines. After the purchase of the 10 new bicycles the $400 appropriated annually will, it is hoped, prove sufficient to allow of the purchase of 4 new bicycles each year, as well as the necessary repairs, and this should be enough to keep the men properly mounted.

The speedometer is required for the additional watchman recently allowed for Potomac Park, as he will be on duty at night, when automobile drivers are inclined to speed their machines, and the testimony of a policeman with a speedometer is required by the courts in cases of arrest for exceeding the speed limit.

The balance ($260) of the increased amount asked for is required to furnish the park watchmen with revolvers and ammunition. A revolver is a necessary part of a policeman's equipment, and he should be allowed a small amount of ammunition for target practice. Although for some years past the appropriation has read "for purchase and repair of bicycles and revolvers for park watchmen and purchase of ammunition," the entire amount has been required for the bicycles, and it has been found impossible to save any of this money for the purchase of revolvers. Some of the men have revolvers that they have purchased themselves, but the majority are unarmed, and this should be remedied.

4. An estimate of $2,800 is submitted "for purchasing and supplying uniforms to park, monument, and bridge watchmen." After a careful consideration of the needs of the men to keep them at all times neatly uniformed the estimated sum of $2,800 was obtained by allowing $54 each to 29 footmen and $50 each to 20 bicyclemen. The balance ($234) will be required for contingencies and the initial issues to new men joining the force.

Furnishing the men with uniforms will prove of benefit in a number of ways. It will of course mean much to the men themselves, who are probably the most poorly paid men in the United States doing police duty in a large city, as they receive only $60 a month, and out of this now have to buy uniforms. When the force of park watchmen was first organized, the men received the same rate of pay as at present and were not required to wear uniforms; their duties were not as arduous or important, as they had no police powers, but simply took care of the parks, watering the plants, etc. Later they were given police authority, and it was found necessary to have them uniformed, but no additional compensation was given them for the

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extra expense involved. To furnish them uniforms means practically no increase in pay, but simply puts them back in their old pay status.

This sum of $2,800 is asked for instead of the increased rate of pay that has been recommended for several years past, and which would have meant nearly $10,000 yearly to the Government.

Another great advantage of the proposed system will be that, with the furnishing of the uniforms in the hands of this office, it will be possible to make the men keep themselves in a more presentable condition than at present. As the men have to buy their uniforms out of their pay, they are allowed to wear them as long as they are serviceable—even at times when they are shabby and worn. Consequently they do not always present the neat appearance they should. This is very noticeable when the park watchmen are on duty with the members of the Metropolitan Police Department, who, although they are required to furnish their own uniforms, receive a much higher rate of pay.

5. The sum of $800 is asked with which to purchase steel fireproof cases for the old records in this office. These consist of the land records, letters, account books, and other records of the commissioners who were appointed by President Washington to lay out and create the federal city. These records are exceedingly valuable, as the titles to all land in the city of Washington start with them. They are now kept in ordinary wooden cases in a building which is only partially fireproof. The records are being constantly examined by lawyers, title insurance companies, and others. Their destruction would cause endless embarrassment and be irreparable. Means for their proper protection should be provided without further delay, and an appropriation for the purpose is urgently recommended.

6. An increase from $26,000 to $30,000 in the item for improving various reservations is asked because of the constantly increasing number of reservations to be maintained and improved. Since 1904 the total number of reservations has increased from 302 to 324, and the number of improved reservations requiring constant attention has increased from 217 to 230. Some of the new ones recently transferred to the Chief of Engineers by the District Commissioners are in the suburb of Petworth and will cost more to improve and maintain than if they were nearer the central portion of the city. Additional improvements to some of the more prominently located reservations are also urgently needed.

7. The estimates for 1911 for grading, soiling, constructing roads, etc., in West Potomac Park amounted to $90,000, but only $25,000 was appropriated. This sum will allow only a small amount of work to be done on the 150 acres of this portion of the park which are still unimproved. The $100,000 now asked for is urgently needed to improve and make available for the use of the public one of the most popular and beautiful parks of Washington.

8. An estimate is submitted for $5,000 for the erection of a park lodge in West Potomac Park. It is to be used as a watchman's lodge, tool house, and convenience station. There are no facilities in the park for the storage of tools, and much time is lost by the workmen in going to and from the storehouse at Fifteenth and C streets SW., where the tools have been kept over night. The lodge will also furnish shelter for the public in inclement weather.

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9. It is desired to open to the public a portion of Potomac Park east of the railroad embankment, and $25,000 is requested to commence its improvement.

10. An estimate is submitted of $6,000 for replacing the old stone flag pavements of the sidewalks on the avenues east and west of the White House and south of the Treasury with cement pavements. The flag pavements are many years old and have been so much damaged by wear and weather that they are unsightly and should be replaced with new pavements.

11. Five thousand dollars is asked for grading the east side of Sixth street in Seaton Park. It was possible the past year to grade the west side of Sixth street near where the bridge over the street formerly stood, owing to the fact that the surplus materials were hauled away without expense to the United States by a contractor who wished the materials for filling purposes. He has completed his work and no one else is likely to repeat the experiment. There are still high embankments on both sides of the park road at this point, which are very unsightly and should be graded, soiled, and seeded. An estimate for grading the site of the old Pennsylvania Railroad depot at Sixth and B streets and the ground west of it is not included, because of the possibility of the new armory occupying those grounds.

12. An estimate of $3,000 is submitted for a large ornamental fountain to be erected at Pennsylvania avenue and Eighth street, where it will be seen and enjoyed by the large number of people who pass there daily during the hot summer months.

13. An estimate of $3,000 is submitted for completing the improvement as originally designed of the terrace on Twenty-second street, between Decatur and S streets NW., by the construction of fountain basins and the erection of four lamp-posts.

14. An increase of $1,000 is recommended in the appropriation for providing trees, plants, etc., for the grounds of the Capitol and House Office Building, and the wording of the item is so changed as to include the Senate Office Building. The increased amount is needed partly to provide for the addition of the courtyard in the Senate Office Building, and partly because it has been found that the present appropriation is not sufficient to replace trees and shrubs that die of old age or are damaged by storms. There has also been an increased demand for foliage and flowering plants for decorating purposes.

15. The estimate for the improvement and maintenance of the Executive Mansion grounds inside the iron fence has been increased from $4,000 to $5,000. For several years past it has been impossible to do the work required on these grounds within the amount of the appropriation, and men belonging to other parts of the force have had to be detailed to the grounds. Special plantings of flowers and bulbs have also been requested for the gardens in these grounds, and this will add materially to the cost of maintenance.

16. The amount authorized by Congress for the construction of the memorial to Gen. Ulysses S. Grant was $240,000, of which $192,000 has been appropriated. It is expected that the memorial will be completed within the next two years, and the balance of $48,000 is therefore requested.

17. An estimate of $10,000 is submitted to meet the expenses of the "Commission of Fine Arts," created by the act approved May 17, 1910. An item for that amount for the service of the fiscal year end-

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ing June 30, 1911, has been inserted by the Senate in the sundry civil appropriation bill for that year.

Financial statement for fiscal year ending June 30, 1910.

Title of appropriation.	Available at beginning of fiscal year.	Appropriated since.	Expended during fiscal year.	Pledged by contract.	Unexpended balance to revert to Treasury.
Building for Offices of the President, 1909–10	$38,067.71	$13,500.00	$51,567.71	.....	.....
Improvement and care of public grounds, District of Columbia, 1910	122,550.00	.....	122,097.86	.....	$452.14
Improvement and care of public grounds, 1910	12,400.00	.....	12,341.22	.....	58.78
Improvement of Potomac Park, District of Columbia	14,217.77	.....	14,217.77	.....	.....
Repairs, fuel, etc., Executive Mansion, 1910	68,000.00	.....	67,627.88	.....	372.12
Lighting, etc., Executive Mansion, etc., 1910	20,520.00	.....	17,698.44	.....	2,821.56
Lighting public grounds, District of Columbia, 1910	10,200.00	.....	9,430.41	.....	769.59
Telegraph to connect the Capitol with the departments and the Government Printing Office, 1910	4,000.00	.....	3,995.35	.....	4.65
Contingent expenses public buildings and grounds, 1910	1,000.00	.....	1,000.00	.....	.....
Salaries of employees public buildings and grounds, 1910	75,050.00	.....	73,378.96	.....	1,671.04
Care and maintenance of the Washington Monument, 1910	11,820.00	.....	11,699.10	.....	120.90
Repair of building where Abraham Lincoln died, 1910	200.00	.....	1.12	.....	198.88
Improvements birthplace of Washington, Wakefield, Va., 1910	100.00	.....	99.75	.....	.25
Maintenance of Highway Bridge across Potomac River, District of Columbia, 1910	16,000.00	.....	16,000.00	.....	.....
Memorial to Gen. Ulysses S. Grant	51,530.99	.....	4,056.15	$47,474.84	.....
Monument to Brigadier-General Count Pulaski	41,395.11	5,000.00	45,917.99	.....	477.12
Monument to General Baron von Steuben	35,477.10	.....	12,116.90	21,250.00	.....
Monument to John Paul Jones	49,968.08	.....	1.10	49,000.00	.....
Monument to Commodore John Barry	48,420.63	.....	1,403.90	.....	.....
Memorial to Christopher Columbus	96,768.50	.....	515.05	20,000.00	.....
Unveiling statue of Gen. Philip H. Sheridan	810.44	.....	575.50	.....	.....
Statue of Thomas Jefferson	5,000.00	.....	.....	.....	5,000.00
Site and pedestal for statue of Henry Wadsworth Longfellow	3,000.00	.....	3,000.00	.....	.....
Site and pedestal for Stephenson Grand Army Memorial	8,000.00	.....	8,000.00	.....	.....
Pedestal for statue of John Witherspoon	500.00	.....	500.00	.....	.....
Unveiling statue of Gen. Thaddeus Kosciuszko	.....	3,500.00	3,218.23	.....	281.77

Very respectfully,

SPENCER COSBY,
Colonel, U. S. Army, Major, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

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APPENDIX G G G.

NORTHERN AND NORTHWESTERN LAKES (CORRECTING AND ISSUING CHARTS—SURVEYS—WATER LEVELS). PRESERVATION OF NIAGARA FALLS.

REPORT OF MAJ. C. S. RICHÉ, CORPS OF ENGINEERS, FOR THE FISCAL YEAR ENDING JUNE 30, 1910.

UNITED STATES LAKE SURVEY OFFICE,
Detroit, Mich., July 16, 1910.

SIR: I have the honor to submit herewith the annual report of the survey of Northern and Northwestern Lakes, and of operations under the appropriation Preservation of Niagara Falls, for the fiscal year ending June 30, 1910.

Very respectfully, your obedient servant,

C. S. RICHÉ,
Major, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

G G G 1.

SURVEY OF NORTHERN AND NORTHWESTERN LAKES.

As early as 1816 local surveys of the Great Lakes for special purposes were made by engineer officers, but the survey of the Northern and Northwestern Lakes as a connected and systematic whole was commenced in 1841 and prosecuted continuously until 1882, when work was suspended, as the data then in hand seemed sufficient for the requirements of navigation of the period. After the suspension and until 1889 operations were limited to the publication and issue of charts, $2,000 or $3,000 being appropriated annually for this work. In 1889 field operations were resumed under an appropriation made therefor, and have been continued under annual appropriations ranging from $5,000 to $150,000. In 1898 these operations were extended to include observations and investigations of lake levels with a view to ascertaining the causes of changes in level, determining the hydraulic data needed for formulating the laws of interlake flow and devising the most feasible method of lake-level maintenance or regulation.

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Operations during the fiscal year have included work related to the several features above referred to, as follows:

Charts.—The reduction, preparation, and reproduction of charts have continued under the immediate supervision and direction of Assistant Engineer Edward Molitor, to whom great credit is due for the quality and quantity of work done.

The following statement shows the number of charts received and disposed of at this office during the fiscal year ending June 30, 1910:

On hand, July 1, 1909	45,562
Received from office files	20
Received from office of Chief of Engineers	6
Received from United States engineer office, Buffalo	11
Prepared by this office	16,564
Total	62,163
Sold	18,034
Issued for official use	2,960
Transferred to United States engineer office, Buffalo	2,887
Destroyed (out of date)	475
On hand, July 1, 1910	37,807
Total	62,163

The total number of charts sold by this office during the year was 18,034, the total amount received from these sales being $2,824.62, which was duly deposited to the credit of the Treasurer of the United States. The total number of charts that have been sold, issued, and transferred through this office to June 30, 1910, is 406,804, including issues to the United States engineer office at Buffalo.

In addition to the regular Lake Survey series of charts, the foregoing accounting includes an edition of 498 Hydrographic Office charts of Lake Erie, of which 26 were issued for official use, 30 were transferred to United States engineer office at Buffalo, and 59 were sold for a total sum of $17.70.

Operations have been continued throughout the year under the provisions of the project approved April 17, 1909. This project originally provided for the preparation of 26 new charts, the revision of 39 old ones, the discontinuance of 21 charts regarded as obsolete, and the publication of 31 of the less important harbor charts as insets to the appropriate coast charts, the series, when completed, to comprise about 104 separate charts. Since the adoption of this project, it has been found necessary to increase the number of new charts by 4, two of these being in lieu of revisions previously contemplated. As the work proceeds, further amendments may be found necessary, and circumstances may arise which will show the necessity of retaining some of the harbor charts as separate publications instead of incorporating them as insets to the corresponding coast charts. The Lake Survey charts which represent Canadian waters only are to be discontinued after exhaustion of present editions, in accordance with agreement concerning the work of this office and that of the Hydrographic Office of the Navy, as noted below. For these reasons, the exact number of charts that will comprise the completed series can not at the present time be definitely stated, and the number given above (104) must be considered as approximate only. It may be further stated that the time required for the completion of this project, given in Annual Report for 1909 as about six

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years, is inadequate to accomplish the work as planned; and such changes as are required by conditions arising in the future will still further increase this estimate.

Additional work has devolved upon the Lake Survey as a result of agreement delimiting the respective spheres of activity on the Great Lakes, of this office, and of that of the Hydrographic Office of the Navy. This agreement was approved by the Acting Secretary of War on December 22, 1909, and by the Acting Secretary of the Navy on December 28, 1909. Under its provisions the Hydrographic Office is to suspend the printing, sale, and publication of all harbor or special charts in American waters, and the Lake Survey, after the exhaustion of present editions, is to discontinue its charts of the Georgian Bay region, and is not thereafter to publish or sell any charts which do not originate out of the necessity of representing the territory of the United States. To enable the preference of lake navigators to be ascertained as to Mercator and polyconic charts, the Hydrographic Office has transferred to the Lake Survey the five copperplates of the general charts of the lakes, editions of which are to be printed and placed on sale by this office. If during any twelve-month period a preponderant demand for either the Mercator or the polyconic charts of any lake is shown by a sale of 90 per cent or more of the total sale of the general chart for that lake, it will be considered that the issue of the less popular chart is unwarranted, and its publication may be discontinued at the discretion of the Lake Survey. In the case of the one Mercator chart covering Lakes Ontario and Erie, its sale is to be compared with the average sale of the two Lake Survey charts of these lakes. As a result of this agreement, unnecessary duplication of work will, in the future, be avoided.

The revision of charts, accomplished during the year, embraced changes in aids to navigation, modifications due to river and harbor improvements, latest magnetic determinations, additional and corrected sailing courses, and the most prominent topographic and hydrographic changes developed by commercial and industrial enterprise on the shores of the lakes and their tributary and connecting waters. Since the adoption of the project of April 17, 1909, all revisions have included the change of geodetic control to the standard datum of 1901, and, whenever time permitted, soundings have been referred to the standard low-water planes approved March 16, 1909. The changes constantly being made in lights and buoys, pier extension, breakwater construction, etc., render necessary a very large amount of hand work, as every chart is corrected, as far as practicable, for all information received to the day it is sent out of the office.

In the statement of work on charts given below, the edition number has reference only to the editions lithographed in colors, many charts having previously appeared as black prints from the original engraved copperplates. Copies of charts were revised, the original engravings on stone or copperplate correspondingly corrected, transfers to stone made, color plates prepared, and the charts printed in colors, as follows:

1. St. Joseph Channel and western end of North Channel; scale 1:40,000; second edition; from Molitor-process copperplate. Issued July 7, 1909.
2. Lorain Harbor, Ohio; scale 1:8,000; second edition; from Molitor-process copperplate. Issued July 24, 1909.
3. St. Lawrence River No. 3; scale 1:30,000; second edition; from engraved copperplate. Issued August 4, 1909.

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4. Coast-chart No. 1, Lake Ontario; scale 1:80,000; fourth edition; from engraved copperplate. Issued October 12, 1909.
5. St. Lawrence River No. 5; scale 1:30,000; fourth edition; from engraved copperplate. Issued November 20, 1909.
6. St. Lawrence River No. 6; scale 1:80,000; fourth edition; from engraved copperplate. Issued January 18, 1910.
7. St. Marys River No. 1; scale 1:40,000; fourth edition; from heliogravure copperplates. Issued March 12, 1910.
8. Duluth-Superior Harbor, Minn. and Wis.; scale 1:18,000; sixth edition; from Molitor-process copperplates. Issued March 31, 1910.
9. South End of Green Bay; scale 1:120,000; second edition; from engraved copperplate and stone. Issued April 6, 1910.
10. Manitou Passage, Lake Michigan; scale 1:30,000; second edition; from Molitor-process copperplate. Issued April 14, 1910.
11. Erie Harbor and Presque Isle, Pa.; scale 1:15,000; fourth edition; from heliogravure copperplate and engraved stone. Issued May 4, 1910.
12. Coast-chart No. 3, Lake Erie; scale 1:80,000; third edition; from engraved copperplate. Issued May 10, 1910.
13. Sandusky Bay, Ohio; scale 1:20,000; fourth edition; from engraved copperplate. Issued June 8, 1910.
14. General Chart of Lake Erie; scale 1:400,000; seventh edition; from stone engraving. Issued June 8, 1910.
15. Maumee Bay and Maumee River (including City of Toledo, Ohio); scale 1:25,000; fourth edition; from Molitor-process copperplate. Issued June 23, 1910.

In addition to the foregoing a black reprint of chart of Niagara Falls was made to supply current demands. Issued October, 1909.

Revisions of copperplates and engravings on stone, preparatory to new editions of the following charts, are in hand:

1. St. Marys River No. 2; scale 1:40,000; for seventh edition; from heliogravure copperplates.
2. Thunder Bay, Lake Huron; scale 1:40,000; for second edition; from engraved copperplate.
3. Little Bay de Noc, Mich.; scale 1:40,000; for second edition; from Molitor-process copperplate. Includes insets of Escanaba Harbor and Gladstone Harbor.
4. Coast-chart No. 7, Lake Erie; scale 1:80,000; for fourth edition; from engraved copperplate.
5. St. Lawrence River No. 2; scale 1:30,000; for second edition; from engraved copperplate.
6. Presque Isle, False Presque Isle, and Middle Island, Mich.; scale 1:40,000; from Molitor-process copperplate; for second edition.
7. General Chart of Lake Huron (including Georgian Bay); scale 1:400,000; for third edition; from engraving on stone.
8. North End of Green Bay; scale 1:120,000; for third edition; from engraved copperplates.
9. Menominee Harbor, Wis. (including Menominee and Marinette); scale 1:15,000; for second edition; from engraving on stone.
10. Coast-chart No. 6, Lake Erie; scale 1:80,000; for fifth edition; from engraved copperplate.
11. Coast-chart No. 5, Lake Michigan; scale 1:80,000; for third edition; from engraved copperplate.
12. Lake St. Clair (Windmill Point light-house to Woodtick Island, St. Clair River); scale 1:50,000; for sixth edition; from heliogravure and engraved copperplate.
13. St. Marys River No. 3; scale 1:40,000; for sixth edition; from heliogravure copperplate.

The following entirely new charts, engraved on stone, were completed and issued in colors during the year:

1. St. Joseph and Benton Harbor, Mich.; scale, 1:8,000. From surveys of 1907 and 1909. Issued July 25, 1909.
2. Ashland and Washburn harbors, Wis.; scale, 1:15,000. From surveys of 1908 and 1907. Issued October 27, 1909.

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3. Niagara River from above the Falls to Lake Ontario; scale, 1:30,000. From surveys of 1906 and 1907. Issued November 12, 1909.
4. Dunkirk Harbor, N. Y.; scale, 1:8,000 (new engraving for second edition). Issued February 18, 1910.
5. Coast Chart No. 3, Lake Superior (south shore from Grand Portal to Big Bay Point, including Manitou Island and Stannard Rock); scale, 1:120,000. Based on surveys made from 1866 to 1906. Issued May 28, 1910.

The following new charts were well advanced at the close of the year:

1. Buffalo Harbor and Niagara River to the Falls (new engraving for fifth edition); scale, 1:30,000. Nearly ready for printing.
2. Kenosha Harbor, Wis.; scale, 1:10,000. From survey of 1909.
3. Straits of Mackinac (Presque Isle, Lake Huron, to Charlevoix, Lake Michigan, including Detour and False Detour passages); scale, 1:120,000. From compilation of old and new surveys.
4. Chicago Lake Front No. 2 (from Gary, Ind., to Hyde Park, Ill.); scale, 1:40,000. From recent surveys and those to be made.
5. Coast Chart No. 5, Lake Michigan (from South Haven, Mich., to Waukegan, Ill.); scale, 1:120,000. New coast chart under project approved April 17, 1909. Additional surveys required before completion.

The following small chart, not included in the regular Lake Survey series, was prepared as an inset to Supplement No. 14 of Bulletin No. 18, and for issue with affected charts:

New shoals along Chicago Lake Front between Grossepoint light and Chicago Harbor; from 1909 survey; scale, 1:80,000. Issued October, 1909.

At the close of the year work was in progress upon the preparation of the following small chart, to be published as an inset in Supplement No. 3 to Bulletin No. 19, during July, 1910:

Magnetic Chart of Lake Superior; scale, 1:1,200,000; from results of observations made by the United States engineer office, Duluth, Minn., 1902–3–4 and 1906; observations on shore made by the Lake Survey, the Coast and Geodetic Survey, and the Canadian Hydrographic Survey between 1902 and 1910; showing magnetic variations, reduced for annual change to the year 1910, at various places over the lake surface and on the shore around the lake.

The work of chart production is that of expert specialists for whose employment there is little commercial demand. Because of this fact the expert services required exist only in a very limited number of government offices. The Lake Survey office is therefore able to perform the work of producing finished charts not only cheaper but better than this can be done by even the largest commercial lithographers, and accordingly in special cases, with the approval of the Chief of Engineers, the services of this office have been employed by engineer officers elsewhere for the reproduction of various maps and for other purposes. All expenses incurred in this class of work are paid for by the offices for which the work is done, either by direct allotment or by reimbursement effected through a Treasury settlement. During the year the following outside work was accomplished:

(a) Under appropriation Maps, War Department, 1910:
1. Map of Department of the Columbia; in two sections, each 34 by 48 inches. Printed in black, 800 copies of each section; September, 1909.
2. Map of United States reservation at Sparta, Wis.; 32 by 48 inches. Printed in black; 5,000 copies; February, 1910.
3. Lithographic equipment for shipment to chief engineer officer, Philippines Division, Manila, P. I. Estimates were prepared during April, and purchase and inspection of materials attended to during May and June, 1910. Shipment was made during the latter month under the direction of the Quartermaster's Department.

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(*b*) For United States engineer office, Detroit, Mich.:
Vicinity of Sault Ste. Marie, Michigan and Ontario, showing American and Canadian canals; scale, 1:15,000. Revised reprint from engraving on stone for inset in Statistical Report of Lake Commerce through the Canals during season of 1909. Two thousand copies, printed in three colors; March, 1910.

(*c*) For various engineer offices:
Cross section paper, 16 by 20 inches, inch divided to tenths; from engraved stone; 3,935 copies, printed in black or green on ledger or suitable transparent paper.

The following is a list of Molitor-process copperplates prepared during the year:

1. Map of the United States, 1870–1873; scale 1:5,000,000; in four sections. Size of copperplates, 22 by 28 inches.
2. Map of the States of Kansas, Texas, and Indian Territory, 1867; revised 1876; in four sections. Size of copperplates, 22 by 28 inches.
3. Outline map of new route from Texas to Fort Yuma, Cal.; Capt. L. C. Overman, 1870; in two sections. Size of copperplates, 20 by 24 inches.
4. Map of part of Colorado, showing lines of communication between Conejos and Pagosa Springs, 1878. Size of copperplate, 22 by 28 inches.
5. Yellowstone and Missouri rivers and their tributaries; Raynolds and Maynadier, 1859–60; in two sections. Size of copperplates, 20 by 24 inches.
6. Tonnage map of the United States; in four sections. Size of copperplates, 22 by 28 inches.
7. Surveys west of one hundredth meridian, showing Mississippi Valley and adjacent section, etc.; to accompany list of reports and maps, June 30, 1881. Size of copperplate, 20 by 24 inches.
8. Military map of Department of the South, embracing Georgia and South Carolina; in two sections. Size of copperplates, 22 by 28 inches.
9. Western Territories (sheet No. 1); prepared by Maj. J. W. Barlow, 1873. Size of copperplate, 20 by 24 inches.
10. Indian Territory with part adjoining Kansas; in two sections. Size of copperplates, 22 by 28 inches.
11. Atlas Sheet No. 49; surveys west of one hundredth meridian. Size of copperplate, 20 by 24 inches.
12. Atlas sheet No. 50; surveys west of one hundredth meridian. Size of copperplate, 20 by 24 inches.
13. Atlas sheet No. 58; surveys west of one hundredth meridian. Size of copperplate, 20 by 24 inches.
14. Atlas sheet No. 59; surveys west of one hundredth meridian. Size of copperplate, 20 by 24 inches.
15. Atlas sheet No. 66; surveys west of one hundredth meridian. Size of copperplate, 20 by 24 inches.
16. Atlas sheet No. 67; surveys west of one hundredth meridian. Size of copperplate, 20 by 24 inches.
17. Conventional signs; surveys west of one hundredth meridian. Size of copperplate, 22 by 28 inches.

By the transfer to copper of above engravings, the stones were made available for the regular chart work of the Lake Survey. In addition to these, the following engravings were transferred to zinc plates and the stones thereby rendered available for future use:

1. Atlas sheet No. 49; surveys west of one hundredth meridian (crayon hill shading).
2. Atlas sheet No. 50; surveys west of one hundredth meridian (crayon hill shading).
3. Atlas sheet No. 58; surveys west of one hundredth meridian (crayon hill shading).
4. Atlas sheet No. 59; surveys west of one hundredth meridian (crayon hill shading).
5. Atlas sheet No. 66; surveys west of one hundredth meridian (crayon hill shading).
6. West Indies; Isthmus of Darien, etc.

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7. Segmental circular arches with solid spandril. Elliptical arches with solid spandrils. Full center arches with solid or hollow spandrils.
8. Index rectangles and numbers for progress and index maps of surveys west of one hundredth meridian.
9. Form for passport, Department of State.
10. Title for map "Territory of the United States from the Mississippi River to the Pacific Ocean, 1865–66–67–68."
11. Movable dam designed by Janicki, with modifications by Gonschkofsky.
12. Plan of platform for King's carriage and bomb traverse, 1874.
13. Circular segmental arches with solid spandrils.
14. Diagrams; comparative heights of floods of the Mississippi, 1858 and 1874.

Hydrographic Office charts.—Under the terms of the agreement noted above, the following work has been done:

1. General chart of Lake Erie; printed in five colors and issued March 8, 1910.
2. General charts of lakes Superior, Michigan, Huron, and Ontario and Erie; at the close of the year preparations for printing editions of these four charts were nearly completed.

The Lake Survey series originally consisted of 76 charts, all of which were printed in black from copperplates. As a result of revisions, additions, and cancellations there are now in force 125 charts, of which one is printed in black from copperplate (Niagara Falls, scale 1:20,000), 71 are lithographs in colors from copperplate transfers, 52 are lithographs in colors from stone engravings, and 1 is a photolithograph in colors.

Of the entire series of charts, there had been issued in colors 5 on July 1, 1900; 12 on July 1, 1901; 30 on July 1, 1902; 49 on July 1, 1903; 59 on July 1, 1904; 73 on July 1, 1905; 97 on July 1, 1906; 110 on July 1, 1907; 117 on July 1, 1908; 122 on July 1, 1909; and 124 on July 1, 1910.

In 1901 the Coast and Geodetic Survey, with the collaboration of the Lake Survey, made a recomputation of the primary triangulation systems of the United States, adjusting the same into one homogeneous net. The result of this adjustment is to give one standard reference or geodetic datum throughout the United States in place of a separate reference for each fragmentary triangulation system. The recomputed geodetic values of the Lake Survey triangulation, so far as it was complete at the time, are published on pages 2905–3031, Report of the Chief of Engineers for 1902, and the datum or reference upon which these are based has been adopted for the projection of Lake Survey charts.

Likewise, in 1903, the Coast and Geodetic Survey readjusted the numerous interconnecting level lines in the United States into one homogeneous system. The adjusted elevations of such lines as pertain to the region of the Great Lakes are published in the Annual Report for 1903, pages 2688–2744.

The standard low-water planes which were adopted for each of the lakes in 1901 were slightly modified by direction of the Chief of Engineers on March 16, 1909, to conform to the level adjustment of 1903 while fulfilling the original intent of expressing in round numbers planes safely below the lowest monthly means of record.

The standard low-water planes, in feet above mean tide at New York, are as follows:

Lake Superior, at Marquette	600.5
Lake Huron, at Harbor Beach	578.5
Lake Michigan, at Milwaukee	578.5
Lake Erie, at Cleveland	570.0
Lake Ontario, at Oswego	243.0

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Since the adoption of standards, all new charts have been projected upon the standard geodetic datum and their soundings have been referred to the appropriate standard low-water plane. The work of revising the old charts to these standards, or replacing them with newly engraved charts, according to the project approved April 17, 1909, is being advanced as rapidly as time will allow. On June 30, 1910, of the current issue of 125 charts, 56 are referred to the standard geodetic datum, and 64 have their soundings reduced to standard low-water plane.

Bulletins.—The bulletins of the Survey of Northern and Northwestern Lakes contain important data and information supplementary to the charts, but of too voluminous a character to be incorporated thereon, and they are accordingly issued free in connection with the charts. Bulletin No. 12, of 1902, and those preceding it were printed in Washington, but on July 10, 1902, the entire work of printing and issuing bulletins and supplements thereto was turned over to this office. Since then the subject-matter has been edited and its publication (under contract) supervised by Mr. O. C. Hattery.

Bulletins Nos. 13 to 17 were annual revisions issued each spring during the years 1903 to 1907, inclusive, and eight monthly supplements to each bulletin were issued during the navigation season, from May to December, inclusive.

Bulletin No. 18, issued in April, 1908, remained current for 1909, seven supplements thereto having been issued in 1908 and eight supplements in 1909. Of these, Supplements Nos. 11 to 15 pertained to the present fiscal year, and covered all reported changes of interest to navigators arising between July 1 and November 15, 1909. They were issued as follows: No. 11, July 20; No. 12, August 18; No. 13, September 21; No. 14, October 25; and No. 15, November 20. Editions of 3,000 copies were printed of each of the foregoing.

As occasion arises small maps showing locations of new shoals, changes in important channels, harbors not otherwise charted, etc., are inserted in the bulletins and supplements. Supplement No. 14 to Bulletin No. 18 contained an inset showing new shoals discovered along the Chicago lake front between Grossepoint light and Chicago Harbor.

Bulletin No. 19, thoroughly revised and giving the latest information obtainable as to channels, harbors, obstructions, magnetic determinations, and other matters of interest to navigators over the entire lakes and connecting waters, was issued late in April, 1910. A coast-line description of Lake Ontario was prepared and published in this bulletin, completing the series of such descriptions for the five Great Lakes. The following supplements to this bulletin, covering all reported changes of interest to navigation, were published: No. 1, May 24, and No. 2, June 18, 1910.

The plan of biennial revision adopted for Bulletin No. 18 was found by experience to afford a less adequate service than the importance of lake navigation warrants. The considerable accumulation of changes extending through a series of 15 supplements impairs the usefulness of the original bulletin as a convenient reference work during the second year. The circulation is also complicated by the fact that the mailing list of one navigation season is rendered inapplicable to the ensuing season by the many changes in addresses, new assignments of masters, etc., leading to duplication of issue and confusion.

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In reverting to the annual revision, the edition for Bulletin No. 19 and Supplements was fixed at 2,600 as an estimated quantity ample to supply all the important interests engaged in the navigation of the lakes, as well as various commercial and industrial concerns and individuals with related activities. The mailing list is carefully revised each year to the end that all proper requests may be cared for, while unnecessary and expensive duplication is avoided.

In connection with the information service of the Lake Survey and in addition to the monthly supplements of the year, the practice has been continued of issuing mimeographed special notices to important lake navigation interests and to all daily newspapers published upon the Great Lakes. These notices place in the hands of those concerned the earliest possible information relating to improvements and obstructions to navigation. The Lake Survey acts as a clearing house for information of this character, which is received from the various district engineers upon the lakes and from private sources and is promptly published. The value and necessity of the service are unquestioned.

Surveys.—At the beginning of the fiscal year, five parties were in the field, one of which was engaged on work in connection with the preservation of Niagara Falls, described in a subsequent part of this report.

The first party, on the steamer *Search*, was engaged on the resurvey of the south end of Lake Michigan, continuing to the northward, along the westerly shore, the hydrographic investigations begun in 1908. This field party was under the immediate charge of Assistant Engineer F. G. Ray until August 26, 1909, when he reported to the Detroit office to succeed, as principal assistant engineer, Mr. Francis C. Shenehon, whose resignation was tendered on September 30, 1909. Mr. Shenehon had most creditably performed the duties of his responsible position since August 16, 1906, and it was with much regret that his resignation was accepted. To him is largely due the credit for the present efficient methods and eminently successful work of the lake survey. After the departure of Mr. Ray, the charge of the Lake Michigan party was assigned to Junior Engineer W. H. Vandeburgh.

The success of the previous season was continued by the discovery of many uncharted and hitherto unknown obstructions. At the beginning of the fiscal year, the party was employed near the entrance of Chicago Harbor, and, on October 24, 1909, when operations in this vicinity were suspended, the hydrographic work of the season had covered an area of 160 square miles, extending between the three and eleven fathom curves and from latitude 41° 51′, 3 miles south of Chicago River, to latitude 42° 06′ 50″, abreast of Winnetka, Ill. In addition, 14 square miles were closely sounded to determine the extent and configuration of certain shoal areas. The shore line topography was also extended northerly from a point 8 miles north of the Chicago River for a distance of about 9 miles, including part of the city of Evanston, and practically all of the towns of Wilmette, Kenilworth, and Winnetka, Ill. The system of control, consisting for the greater part of water triangulation, which had been carried from the vicinity of Michigan City, Ind., was extended to Winnetka, Ill., and a connection was made with the line △ Park Ridge-Chicago Waterworks Tower of the 1874 primary triangulation.

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Some of the important discoveries of shoals and other obstructions in the vicinity of Chicago that were made during the season are noted in the following extract from the report of Junior Engineer Vandeburgh:

Bearings given are true and depths are reduced to standard low-water plane.

1. Spar or snag in 32 feet of water lying S. 65° W. 3,300 feet from Four-mile Waterworks crib, with least depth of 22.5 feet.
2. Pile of rock S. 86° W. 8,100 feet from Four-mile Waterworks crib, with least depth of 16 feet surrounded by depths of 28 to 30 feet. (This obstruction has since been removed.)
3. Mound of rock S. 85° W. 9,150 feet from Four-mile Waterworks crib, with least depth of 19.5 feet surrounded by depths of 25 feet.
4. Mound of rock and gravel about 1,000 feet long north and south and 600 feet wide, lying S. 38° E. 7,850 feet from Chicago Rear Range Light, with least depth of 16.7 feet.
5. Hard sand and gravel shoal, east 9,400 feet from the mouth of Chicago River, with least depth of 21.5 feet. This shoal is about 1,500 feet long in a north and south direction, with three mounds with less than 24 feet depth.
6. Small sand and gravel shoal N. 17° W. from the northwest end of Chicago Outer Breakwater, with a minimum depth of 12.5 feet.
7. A group of three shoals northerly of the westerly entrance to Chicago Outer Harbor, the shoalest, having a clear depth of 19.6 feet, lying N. 9° 30′ E. 2,300 feet from the westerly end of Chicago Outer Breakwater.
8. Small rock shoal S. 29° W. 8,900 feet from Lakeview Waterworks crib, with a least depth of 9.5 feet.
9. Pile of rock S. 27° W. 6,100 feet from Lakeview Waterworks crib, with a least depth of 10.7 feet.
10. Small rock shoal S. 69° W. 5,900 feet from Lakeview Waterworks crib, with a least depth of 15.5 feet.
11. Pile of rock S. 83° W. 4,000 feet from Lakeview Waterworks crib, with a least depth of 14 feet.
12. An area of about 7 square miles lying northerly of Lakeview Waterworks crib, bounded by latitudes 41° 59′ 30″ and 42° 02′, and extending about 3½ miles easterly from shore, consisting of hard sand and gravel with numerous outcroppings of rock upon which are depths varying from 15.5 feet to 21 feet. Within this area was found a wreck lying N. 11° 20′ E. 3⅝ miles from Lakeview Waterworks crib, with a least depth of 20 feet.
13. Numerous mud piles, apparently old dredge dumpings, southerly of the mouth of Chicago River, some of which are obstructions to the entrance to the harbor. A minimum depth of 9.5 feet was found 1,000 feet east of the south entrance.
14. Several uncharted shoals just northerly of Grosse Point, the positions of which are such as not to be dangerous to navigation.

Notices of most of the above shoals were promptly issued to the press, after reports had been received at the Detroit office, and descriptions and locations were noted in the first bulletin supplements following their discovery. A special inset chart in Supplement No. 14, to Bulletin No. 18, shows the detail development of the shoal areas north of Lakeview Crib.

After the suspension of the work in the vicinity of Chicago, the field party proceeded to Kenosha, Wis., and completed a detailed survey of the harbor and approaches. This survey was based on the primary line Somers (1873)–Kenosha Catholic Church spire, from which a system of control was developed. About 5 square miles of topography were taken, covering the entire city and extending along the shore 2 miles either side of the harbor entrance. The harbor was thoroughly sounded, as was also an area of 8¼ square miles in the open lake along the shore. Of the latter, 4¼ square miles were swept.

On November 17 the Kenosha survey was completed and the party started for Detroit. The automatic gauges at Milwaukee and Mack-

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inaw City were inspected en route, and a stop was made at the north end of Lake Huron to investigate a report of a wreck said to lie southeasterly of Espanore Island, and also to attempt to locate a shoal whose position in Potagannissing Bay had been definitely reported to this office. The lateness of the season precluded investigations other than in the immediate locations given. No indications were found of either the wreck or the shoal.

Mr. Vandeburgh left the party at Cheboygan, Mich., inspected the automatic gauge at Marquette, and proceeded to Detroit by rail. The steamer reached Detroit on December 14 after experiencing numerous discouraging delays on account of weather and a leaky boiler.

The second party under Junior Engineer Andrew J. Swift, on the steamer *Col. J. L. Lusk*, was engaged on a hydrographic survey, including shore-line topography and control by triangulation, along the west coast of Lake Huron. On July 1, 1909, the party was at work in the vicinity of Mast Point on the westerly side of Hammond Bay. The field work was continued until November 19, completing the survey to the vicinity of Presque Isle Harbor. The hydrography included the sounding of a belt about 5 miles wide along the shore and the sweeping of all areas having depths between 21 and 50 feet. Inshore soundings were taken off Mast Point, extending below the Grace Harbor Lumber Company dock; also in the vicinity of Hammond Bay life-saving station, Spens Mill dock, Rogers, Mich., Crawford Quarry dock, and Thompson's Harbor. After the beginning of the fiscal year, 178 square miles were sounded, 24 square miles of which were swept. Aside from corrections in the location of the shoal water contours along shore, no important discoveries were made. The great value of this work lies in the resulting assurance of clear, navigable depths along this important thoroughfare.

Excepting a small stretch in the vicinity of Rogers, Mich., surveyed in 1904–5, and a part of Presque Isle, including the harbor, which was surveyed in 1904, complete data were obtained for revising the shore-line topography from Mast Point to North Albany Point. The shore of Lake Esau was also run. The total length of shore thus traversed was 46 miles. Geodetic control for the topography and hydrography was established where the existing triangulation was not sufficient. From Nine Mile Point to Forty Mile Point this was accomplished by water triangulation extended from the line ▲ 74-▲ 9 of the previous season's work. The closing errors at ▲ Forty Mile Point, which was located in 1903 from the primary system, were 0.90 meter in position and 1.75 seconds in azimuth. From Forty Mile Point to Adams Point the stations which had been established during the progress of the Lake Huron primary triangulation gave adequate control. Between Adams Point and Presque Isle Harbor stations were located on Observatory Point and Black Point by ordinary triangulation from a computed line between ▲ Adams Point (1905) and Presque Isle light (1904). Additional stations were located on North Albany Point at the outer entrance of Presque Isle Harbor, and on Wreck Point, 5½ miles southeasterly of Presque Isle light. Also two tertiary stations were established within the harbor for the purpose of locating the Presque Isle Harbor range lights and the old Presque Isle light tower.

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The steamer and party arrived in Detroit on November 24, and were employed until December 2 on hydrographic work in the American channel of the Detroit River near Belle Isle. After signals had been placed over the available geodetic stations, the channel was sounded from Windmill Point to the Waterworks dock. A shoal area was encountered near the Windmill Point range upon which was found a least depth of 15.0 feet, referred to low water plane. The center of the shoal is 550 meters (⅓ mile) N. 46° E. from Belle Isle east end spar buoy and 240 meters toward the American shore from the Windmill Point range sailing line. Least depths were verified with the sweep. Two other obstructions, apparently sunken cribs or wrecks, were located in the navigable channel outside of Waterworks dock. One is situated S. 82° E. 260 meters distant from the southwest corner of the dock and has a least depth of about 8½ feet below low water plane. The other is S. 44° E. 90 meters from the same dock. The sudden call for the steamer to go to the relief of the *Search* at Alpena prevented the completion of the examination. The existence of heavy ice in the river when the steamer returned made further hydrographic work impossible, and the boats were placed in winter quarters.

The third party on the steamer *Surveyor*, under Junior Engineer (now Assistant Engineer) M. S. MacDiarmid, was engaged on July 1, 1909, in sweeping and sounding west of Bass Islands in the west end of Lake Erie. Owing to the receipt by this office of several reports of the striking of vessels upon some obstruction to the northwestward of Colchester light, the *Surveyor* party was assigned the duty of making an investigation of the waters in this locality. Four square miles were swept without encountering anything other than the wreck of the *Grand Traverse*, which was in its charted position. The party resumed its work west of the Bass Islands on July 14, and from then until November 12, 1909, continued its operations to the southward and eastward, reaching a point in the South Passage three-fourths of a mile southeast of South Shoal gas buoy. An area of 83 square miles, bounded on the west by a line from Middle Sister Island to Niagara Reef gas buoy, on the north by latitude 41° 45′, and on the east by the Bass Islands, was swept to prevailing depths. Control was established by a system of triangulation developed from the line △ Old Hen-Middle Island light, 20 stations being occupied. A complete topographical survey was made of South Bass Island, and the shore line of Middle Bass Island and about one-half of the shore line of North Bass Island were taken with the transit and stadia.

To avoid the rough fall weather which seriously interferes with work on the open lake, the party was ordered to Cleveland, Ohio, on November 12, 1909, with instructions to undertake a survey of the harbor and approaches. Owing to the unusually stormy weather and the smoky condition of the atmosphere very little triangulation or sweeping were accomplished. The topographic work was completed along and adjacent to the Cuyahoga River from the Baltimore and Ohio Railroad yards, south of Holmden avenue, to Columbus road. Field work was discontinued on December 18, and the technical party proceeded to Detroit by rail.

The fourth party, under Junior Engineer H. F. Johnson, was engaged on the primary triangulation that is being extended southward along the west side of Lake Huron to connect the Mackinaw

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base line, the St. Marys River system, the Canadian triangulation on the north shores of Lake Huron, and the detached system of Saginaw Bay with the systems of Lake St. Clair and Lake Erie. At the beginning of the fiscal year the observing party was at station Worth. Between then and December 17, when field work was discontinued, seven primary stations (Worth, Atkins, Avoca, Lenox, St. Clair, Walpole, and Mount Clemens) were occupied, extending the main system a distance of 60 miles to the south shore of Lake St. Clair. From July 1 to the end of the season progress was slow, the prevalence of smoke delaying the angle reading over the long lines. During the entire season ten stations were occupied, at which were read 410 sets of primary angles, closing 19 triangles. The average horizon closure was 0.82 second, and the average triangle closure, after making the station adjustments, was 0.72 second. The average length of line was 13.54 miles. Recorder D. F. Jennings was detailed to complete the system of secondary triangulation along the Lake Huron coast from Harbor Beach to Kettle Point on the Canadian shore. Fifteen secondary stations, two light-houses, and two of the previous season's primary stations were occupied. The angles were read with a ten-second repeating theodolite, and the results were exceedingly satisfactory. The reconnaissance and station building party dismantled 5 gas-pipe towers, located and marked 11 primary stations, built 3 wooden and 6 gas-pipe observing towers, and erected a secondary station at Huron Point, Lake St. Clair, and a tripod at △ Casco.

The party engaged on hydraulic measurements in the canals of the power companies at Niagara Falls, N. Y., working under projects for the appropriation of the act of June 29, 1906, completed its assignment on August 8, 1909. An advance party immediately proceeded to Sault Ste. Marie, Mich., and upon arrival began the measurement of flow through the canal of the Michigan-Lake Superior Power Company. The work was completed on August 21, with 29 measurements of the flow, including a full determination of vertical curves. Upon August 16 the steamer *No. 1*, with the catamaran and the balance of the party, reached Sault Ste. Marie. From then until October 1 the entire party, under charge of Junior Engineer Sherman Moore, was engaged in measurements of flow in the canals of the several power companies and over the rapids of St. Marys River. Gauges were established at piers 2 and 9 of the International Bridge; 37 measurements of flow through the canal of the Edison Sault Electric Company were taken by means of floats, and were verified by meter measurements in spans 1 and 2 of the International Bridge; a full set of vertical curves was determined and 20 complete measurements were made of the flow through the canal of the Lake Superior Corporation; and, a reconnaissance of the lower river failing to disclose a more suitable discharge section, the measurements of flow in the main river were made from the International Bridge, with 30 independent determinations of discharge over a range of about 1 foot of Lake Superior stage.

The following tables give a summary of the discharge measurements over the St. Marys Rapids, together with a comparison of the several determinations of flow in the St. Marys River made by the Lake Survey since 1896:

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UNITED STATES LAKE SURVEY, HYDRAULICS OF ST. MARYS RIVER, INTERNATIONAL BRIDGE SECTION.

Summary of discharge measurements.

Number.	Date.	Water surface elevations.				Fall.	
		Above locks.	Pier 2.	Pier 9.	Below locks.	c-d.	e-f.
a	b	c	d	e	f	g	h
	1909.						
1	Sept. 18	601.68	600.65	598.79	582.10	1.03	19.58
2	...do	601.71	600.66	598.81	582.10	1.05	19.61
3	...do	601.62	600.63	598.78	582.09	.99	19.53
4	Sept. 20	601.63	600.63	598.77	582.00	1.00	19.63
5	...do	601.64	600.65	598.79	582.04	.99	19.60
6	...do	601.52	600.58	598.76	582.05	.94	19.47
7	...do	601.72	600.65	598.77	582.09	1.07	19.63
8	Sept. 21	601.87	600.72	598.85	582.10	1.15	19.77
9	...do	601.40	600.57	598.82	582.03	.83	19.37
10	...do	601.30	600.50	598.72	582.10	.80	19.20
11	...do	601.78	600.66	598.80	582.17	1.12	19.61
12	Sept. 22	601.96	600.84	598.93	582.57	1.12	19.39
13	...do	601.87	600.76	598.87	582.50	1.11	19.37
14	...do	602.29	600.93	599.06	582.37	1.36	19.92
15	...do	602.10	600.89	598.97	582.27	1.21	19.83
16	Sept. 23	602.14	600.91	598.98	582.07	1.23	20.07
17	...do	602.07	600.91	598.98	582.04	1.16	20.03
18	...do	602.07	600.95	598.96	581.92	1.12	20.15
19	...do	602.21	600.91	599.02	581.91	1.30	20.30
20	Sept. 24	602.01	600.90	598.96	582.19	1.11	19.82
21	...do	601.92	a 600.78	598.91	582.09	a 1.14	19.83
22	...do	602.10	a 600.86	598.97	582.08	a 1.24	20.02
23	...do	602.19	a 600.90	599.00	582.03	a 1.29	20.16
24	...do	601.94	a 600.79	598.91	581.99	a 1.15	19.95
25	Sept. 25	601.77	a 600.70	598.86	581.94	a 1.07	19.83
26	...do	601.94	a 600.79	598.90	581.94	a 1.15	20.00
27	...do	602.08	600.81	598.95	581.96	1.22	20.07
28	...do	601.84	600.75	598.88	581.93	1.09	19.91
29	Sept. 27	601.92	600.76	598.85	581.88	1.16	20.04
30	...do	601.95	600.78	598.92	581.87	1.17	20.08

Number.	Date.	Wind.		Change during measurement. Above locks.		Meter.	Rating.	Volume of flow (cubic feet per second).	Weighted mean index velocity.
		Direction.	Velocity.	Rise.	Fall.				
a	b	i	k	l	m	n	o	p	q
	1909.								
1	Sept. 18	SE.	18	0.10	0.09	9B	G	51,090	8.34
2	...do	SE.	18	.20	.26	9B	G	50,880	8.31
3	...do	SE.	8	.17	.14	3B	F	52,420	8.62
4	Sept. 20	NE.	4	.13	.23	9B	G	51,300	8.40
5	...do	NE.	5	.08	.22	9B	G	51,700	8.48
6	...do	SE.	10	.14	.28	3B	F	49,200	7.98
7	...do	SE.	12	.33	.10	3B	F	51,960	8.25
8	Sept. 21	SE.	4	.94	.04	3B	F	55,820	8.83
9	...do	SE.	6	.44	1.02	3B	F	49,310	8.19
10	...do	SE.	10	.16	.84	9B	G	47,740	7.90
11	...do	SE.	20	.67	.22	9B	G	51,840	8.33
12	Sept. 22	SW.	4	.28	.55	9B	G	58,600	9.06
13	...do	SW.	10	.41	.04	9B	G	55,980	8.83
14	...do	NW.	35	.25	.17	3B	F	60,510	8.99
15	...do	NW.	35	.18	.64	3B	F	59,240	8.96
16	Sept. 23	NW.	35	.17	.12	3B	F	60,470	8.90
17	...do	NW.	40	.07	.17	3B	F	59,480	8.68
18	...do	NW.	45	.40	.06	3B	F	57,780	8.56
19	...do	NW.	45	.09	.14	9B	G	59,170	8.96
20	Sept. 24	NW.	8	.08	.23	9B	G	58,830	8.91
21	...do	NW.	15	.09	.08	9B	G	56,590	8.83
22	...do	NW.	18	.17	.04	9B	G	58,530	8.96
23	...do	NW.	35	.09	.13	3B-9B	F-G	61,800	9.24
24	...do	NW.	35	.06	.23	9B	G	57,060	8.75
25	Sept. 25	NE.	10	.04	.28	1B	H	55,120	8.80
26	...do	NE.	15	.30	.02	1B	H	57,500	8.91
27	...do	NW.	10	.01	.22	1B-9B	H-G	55,020	8.46
28	...do	NE.	15	.06	.18	9B	G	53,840	8.56
29	Sept. 27	NW.	6	.14	.11	1B	H	56,480	8.85
30	...do	NW.	15	.08	.05	1B	H	56,730	8.90

a Interpolated.

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U. S. LAKE SURVEY, HYDRAULICS OF ST. MARYS RIVER.

Discharge of St. Marys River.

Year.	Flow in rapids (southwest pier, 601.85).	Flow in power canals.			Flow in ship canals.		Total flow in auxiliary channels.	Total flow of river (southwest pier, 601.85).	Increment of flow.	Section.	Season.
		Edison Sault Electric Co.	Lake Superior Corporation.	Michigan Lake Superior Power Co.	United States.	Canada.					
a	*d*	*e*	*f*	*g*	*h*	*i*	*k*	*l*	*m*	*n*	*o*
1896	.....	.....	.....	.....	.....	.....	.....	71,990	18,830	Sprys Dock..	Winter.
1899	77,040	1,400	5,000	.....	600	150	7,150	84,190	13,910	International Bridge.	Summer.
1902	59,210	1,400	13,000	.....	600	150	13,000	72,210	15,540	.....do.....	Do.
1905	.....	.....	.....	.....	.....	.....	.....	76,020	18,485	Brewery.....	Winter.
1909	55,660	910	6,130	12,300	450	200	19,990	75,650	15,300	International Bridge.	Summer.

Upon the completion of the above work in the St. Marys River, this party proceeded to Port Huron, Mich., to resume the previous season's investigation of hydraulic conditions at the head of St. Clair River. Self-registering gauges were established at Fort Gratiot light-house, on Section Gorge, at the mouth of Black River, and at Roberts Landing, in addition to the permanent gauges at Grand Trunk Railway, Dry Dock, and St. Clair Flats Canal. Thirty-eight determinations of the flow were obtained at Section Gorge and 24 at Section Dry Dock. Section Gorge was resounded and eight observations were made on each point of the vertical velocity curves. In addition, permanent concrete monuments were set to mark the several sounding sections at the head of the river, and considerable topography was taken in the vicinity of Sarnia, Ontario. Owing to the illness of Junior Engineer Moore, the field work was under the charge of Junior Engineer W. S. Richmond after October 25, 1909. Field work was discontinued on December 14.

During the present working season two parties have taken the field.

The first party with the steamer *No. 1*, under charge of Junior Engineer Sherman Moore, left Detroit on April 22, 1910, to begin a full season's hydraulic work on the St. Clair River. The important problem of establishing the law of discharge of this river with respect to lake stage is not only complicated by the small range of Lake Huron elevations and the backwater effects of Lake St. Clair, but observations so far obtained indicate a seasonal cycle caused by vegetable growth in the delta. With a view of obtaining a definite knowledge of all conditions involved, this party is following a programme whereby discharge measurements are to be taken at the head of the river, and also through each of the six main channels in the lower river during each month of the open season.

Preliminary to starting its regular work, a resurvey was made of Black River shoal to determine the effects of the private dredging in the vicinity. A special sketch was submitted to this office and the results duly noted in Supplement No. 2 to Bulletin No. 19.

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Since resuming the hydraulic work of the season the party has made 50 measurements of flow on Section Gorge and 15 on Section Dry Dock at the head of the river, and from 4 to 6 measurements in each of the six main channels at the mouth of the river. Suitable gauges have been established and maintained and all meters were thoroughly rated both in May and June.

A party under charge of Asst. Engineer M. S. MacDiarmid left Detroit on May 31, 1910, on board of the steamer *Surveyor* to resume the harbor survey of Cleveland, Ohio. During the month of June the system of control has been established, 13 stations having been occupied, and the sweeping has been completed over about 22 square miles, or three-fourths of the total area required. En route to Cleveland the party attempted to relocate the lone spar discovered by the Lake Survey in August, 1907, lying S. 56° E. 2¼ miles from Colchester light-house. An investigation with the sweep failed to determine its position, and it is believed to have disappeared or to have been moved by the ice.

Water triangulation.—On page 2786 of the Report of the Chief of Engineers for 1905 is given a brief description of so-called water triangulation, which was then devised to solve an extremely difficult problem of establishing control for a survey where the usual form of triangulation was not feasible. The success of this experiment has resulted in the extensive use of water triangulation by the field parties of the Lake Survey in establishing systems of control for hydrographic and topographic surveys on the lakes. In connection with the survey of the south end of Lake Michigan it was found advisable to resort to this method of coordination almost entirely, and a system based on the primary triangulation in the vicinity of Michigan City, Ind., has been extended in connection with the hydrographic work as far as Ravinia Park, Ill. The test of this system by connection with a primary line at Chicago and the economy with which the work was prosecuted prove beyond question the expediency of the method. That reference to water triangulation in connection with the reports of the Lake Survey field work may be more easily understood, the following report of the Lake Michigan triangulation of the past two seasons has been prepared by Principal Asst. Engineer F. G. Ray, to whose initiative the method is due:

Upon undertaking the resurvey of the south end of Lake Michigan in 1908, the first consideration was the method of establishing a suitable geodetic control for the extensive hydrographic and topographic surveys which were contemplated. The old primary stations on the south shores of the lake were inadequate, being widely separated and in many cases destroyed by shifting sand hills or by city improvements. To establish stations at suitable places along the shore by the usual methods would necessitate extending a continuous triangulation system around the end of the lake, involving a difficult reconnaissance and extensive station building to obtain clear lines of sight over or among the timbered hills and the tall city buildings. The successful experience of the writer with the method of water triangulation for establishing control for certain surveys in Green Bay (described briefly on p. 2786, Report of the Chief of Engineers for 1905) suggested a similar solution for the problem of establishing control for the surveys in the south end of Lake Michigan. Accordingly, a system was started from an available line of the primary triangulation in the vicinity of Michigan City, Ind., and it has been extended westward and northward along the shores of the lake to Ravinia Park, Ill., the present limits of the survey. A connection was had with a primary line north of the Chicago River, the results of which are believed to indicate the average degree of accuracy of the method and to warrant the use of water triangulation under suitable conditions.

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for future operations of the Lake Survey. The details of the Lake Michigan work are as follows:

Using the line △ Otis—Deutsche Evangelical (St. John's) Church, Michigan City, of the 1874 primary work, stations △ Field and △ City West were established on the lake shore to the westward of Michigan City and their coordinates and the azimuth and length of the line between them were determined by the ordinary methods of triangulation. A third station (Dune Park), about 4½ miles westerly from △ City West, was located geodetically by reading a series of angles simultaneously from the three stations to a target on the foremast of the steamer *Search*, anchored offshore abreast of the middle station. Each set of readings supplied data for a single determination of the distance from △ City West to the new station by computation through the two triangles whose bases are the known and the required lines and whose common vertex is the target on the steamer's spar. The mean of all determinations was used in deriving the length of the advance line. The azimuth of this line was found by an independent, accurate measurement of the angle at the middle station between it and the back line. This programme constitutes one transfer by the method of water triangulation. Other stations were established in like manner, advancing the system along the shore, By nine transfers the control was extended to the lake front of Chicago, the last line, △ Chicago Beach—△ Chicago River, lying immediately south of the mouth of Chicago River. From this line a secondary triangulation system gave a connection with the line △ Park Ridge—Chicago Waterworks Tower of the 1874 primary work. The closing errors were 10.36 seconds in azimuth and 757 in seven places of logarithms for the length of side. After distributing the azimuth error and recomputing the coordinates from Michigan City, the error of closure in position was 0.3 meter. The errors of length of side and position were then corrected by a least square adjustment. A recomputation gave the final geodetic values. With the line Fourmile Crib— △ Lake View, of the secondary system at Chicago, as a base, control was advanced to Ravinia Park by two additional transfers by water triangulation. The values of this latter work have not yet been checked.

In the field work the simultaneous observations to the steamer were made with a 10-inch Troughton & Simms micrometer theodolite, a 10-inch Wurdeman micrometer theodolite, and a 7-inch Buff & Berger transit theodolite reading by vernier to 10 seconds. From 20 to 30 separate sets of angles were read for the transfer of length. The azimuth angle was determined in all cases by 10 sets of observations read with the Troughton & Simms theodolite, the most accurate of the three instruments. Extreme care was used in making all observations, following the usual programme of reading alternately forward and backward and with telescope direct and reversed on equally spaced divisions of the graduated circle for the purpose of eliminating instrumental errors. It is believed that the results obtained compare favorably with good secondary triangulation work, with all advantages in favor of the method of water triangulation in the matter of economy and availability of the control for immediate use as a framework for the topography and hydrography. The cost of that part of the Lake Michigan control established by water triangulation, including the station building and the full expense of the party while actually engaged on the work, did not exceed $20 per mile of advance.

From the experience gained on this survey the following instructions have been formulated for the use of water triangulation by the field parties of the Lake Survey:

A system of so-called water triangulation as a basis for topographic and hydrographic work may be substituted for secondary triangulation, the choice of methods being based entirely upon the question of economy. However, exceeding care must be exercised in the various operations of water triangulation to maintain the requisite degree of accuracy.

The terminals of the system when involving more than two transfers should always be checked for position or for length and azimuth. This check may be had by closure upon lines of other systems or by a specially measured base and astronomic azimuth.

In an extended series there should not exceed 10 courses between determinations of astronomic azimuth, nor 20 courses between measured bases.

The azimuth and base measurement should be performed with the care and accuracy of good secondary triangulation practice.

To maintain well-conditioned triangles it is necessary to adhere to the following general rules:

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1. The outer angle at a shore station between the two adjacent stations should never exceed 220°.

2. The length of lines should be as uniform as possible, and no line should exceed twice the length of either adjacent line.

3. The steamer should be anchored so as to divide the angle at the center station about equally, with the distance from shore such that the angle at the steamer between extreme stations is approximately equal to 180°—one-half total angle at center station.

The lengths of lines along shore should be kept within the limits of from 3 to 8 miles.

The angles should be read with three good direction instruments, or with repeating instruments reading to ten seconds. The three observers, at the three successive stations, read simultaneously from an adjacent station to the signals on the steamer. These signals are given at four-minute intervals, and not less than 20 sets of observations comprise a transfer.

Each set is read as follows:

Read on mark.
Read on steamer target or signal.
Read on mark.

Alternate sets are read with telescope direct and reverse, and the upper motion is shifted 18° after each alternate set.

Angles from steamer should be read to only one shore mark. If this mark is not one of the adjacent stations, the angle from the mark to an adjacent station will be determined separately by 10 sets of carefully read angles.

The azimuth angle, from back to forward station, should be determined separately by 10 sets of angles, read under good atmospheric conditions.

The target on steamer should be so constructed that the simultaneous pointings from the three stations are to a common point. A good form is a black canvas cylinder, 2½ feet diameter and 6 feet high, on the steamer's spar, the bottom being stationary and the top of cylinder being raised or lowered with a running halyard.

The computations for transfer of length should be made in form as follows:

FORM OF COMPUTATION FOR WATER TRIANGULATION.

Log. length, City West to Dune Park... 3.8728777
Mean (f_1-f_2)..... 0.1031397

Log. length, Dune Park to Sabinsky... 3.9760174=9,462.75 meters=5.880 miles.

Computation of water triangulation: City West—Dune Park—Sabinsky, May 27, 1908.

△ City West—Dune Park—Steamer.					△ Dune Park—Sabinsky—Steamer.				f_1-f_2.
Time.	Station.	Angles.	Log. sin.	$f_1=\log.\frac{\sin A.}{\sin D_1}$.	Station.	Angles.	Log. sin.	$f_2=\log.\frac{\sin C.}{\sin D_2}$.	
3-26	A	53-02-56.5	9.9026277	.....	C	40-42-56.2	9.8144507	.....	.....
	B_1	80-23-58.4	.....	.....	B_2	90-34-18.4	.....	.....	.....
		133-26-54.9	9.8609317	0.0416960		131-17-14.6	9.8758766	9.9385741	0.1031219
3-30	A	53-02-01.5	9.9025413	.....	C	40-43-53.4	9.8145906	.....	.....
	B_1	80-25-50.9	.....	.....	B_2	90-32-25.9	.....	.....	.....
		133-27-52.4	9.8608170	0.0417243		131-16-19.3	9.8759788	9.9386113	0.1031125

NOTE.—Angle A at City West, from Dune Park to steamer; angle B_1 at Dune Park, from City West to steamer; angle B_2 at Dune Park, from Sabinsky to steamer; angle C at Sabinsky, from Dune Park to steamer; angle D_1 at steamer, from City West to Dune Park; angle D_2 at steamer, from Dune Park to Sabinsky.

Geodetic positions should be computed on regular L. M. Z. forms, using derived lengths and adjusted azimuths of the lines. All computations pertaining to water triangulation should be made in duplicate, each set being worked independently and by different computers.

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Water levels.—The stage of water in the lakes and in the interlake and outflow rivers has been recorded as heretofore by the regular series of self-registering gauges. The gauge at dry dock, Port Huron, was discontinued at the end of the field season of the St. Clair River discharge party on account of repairs being made to the dock on which it stood. It was reestablished in June, 1910. The gauge at Cleveland was installed in June, 1910, in a tile well under the new dock at the life-saving station, and is now in excellent condition and will probably be stable for many years. The gauge at St. Clair Flats is maintained by the United States engineer office under Col. C. McD. Townsend, Corps of Engineers, during the season of navigation and by this office during the winter season.

The series of gauges comprises 11 self-registering and 1 staff gauge, as follows:

1. Lake Ontario at Tibbetts Point.
2. Lake Erie at Buffalo.
3. Lake Erie at Cleveland.
4. Detroit River at Fort Wayne.
5. Lake St. Clair at Windmill Point (staff).
6. St. Clair River at head of St. Clair Flats Canal.
7. St. Clair River at Port Huron.
8. St. Clair River at Port Huron.
9. Lake Huron at Harbor Beach.
10. Straits of Mackinac at Mackinaw City.
11. Lake Michigan at Milwaukee.
12. Lake Superior at Marquette.

In addition, this office received records of the self-registering gauges maintained by the district offices, as follows: Detroit River at Amherstburg, Lake Michigan at Chicago, St. Marys River below the locks, and St. Marys River above the locks, and records of staff-gauge readings on Lake Ontario at Oswego and on Lake Superior at Houghton and Duluth.

The zeros of all gauges maintained by the survey have been carefully checked during the past year and the instruments overhauled. The records are for the most part excellent.

Monthly means of water level for stations named expressed in feet above mean tide at New York.

[Adjusted levels of 1903.]

	1909.						1910.					
	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.
Marquette.....	602.18	602.40	602.40	602.29	602.26	602.26	602.01	601.74	601.51	601.62	601.74	601.86
Milwaukee.....	581.05	581.07	580.80	580.32	580.21	580.17	579.95	579.94	580.01	580.37	580.50	580.59
Harbor Beach..	581.13	581.02	580.80	580.40	580.12	580.08	579.99	579.98	579.99	580.10	580.42	580.54
Cleveland.....	573.00	572.80	572.36	571.76	571.61	571.39	571.25	571.16	571.66	572.08	572.57	572.68
Oswego.....	247.16	246.82	246.28	245.84	245.35	245.21	244.94	245.03	245.75	245.97	246.42	246.46

There is herewith a sheet showing the monthly mean water levels of all the Great Lakes from January, 1860, to June, 1910, both inclusive.

During the year there has been issued a series of notices to navigation interests giving the monthly mean stages for all the lakes during the preceding month, comparing these stages with corresponding

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ones for critical years, and predicting the stages to be expected for the following month. These notices have been accepted as authoritative and of great usefulness.

Investigation of lake levels.—The taking of air and water temperatures was continued during the season by all steamer parties engaged in hydrographic work.

The following table gives a summary of discharges, as so far determined, corresponding to the mean elevations of the various lakes for the last fifty years:

Table of mean discharges.

Mean elevation for 50 years (1860–1909) above mean tide at New York City, in feet.		Corresponding mean discharge in cubic feet of water per second.[a]	
Lake.	Stage.	River.	Discharge.
Superior	602.30	St. Marys	56,000
Michigan-Huron	581.31	St. Clair	210,000
St. Clair at Flats Canal	575.76	Detroit	215,000
Erie	572.60	Niagara	211,000
Ontario	246.22	St. Lawrence	244,000

[a] The volumes of discharge are for open-season flow and for such conditions of outflow as existed in the year 1909. They do not include the flow in the power canals in St. Marys River, nor that in the Chicago Drainage Canal, nor the flow from Lake Erie through the Welland and Erie canals.

Plant.—The floating plant of the survey consists of five small steamers, three of which are equipped with launches for use on sweeping operations. None of the steamers was originally built for survey work and they are not entirely fitted for the use to which they are put. Alterations that have been made from time to time have, however, made these boats quite serviceable for the work. A new water-tube boiler has been ordered for the steamer *Search* and she will be out of commission until it is installed, which will probably be in July, 1910. During the past year the rebuilding of the steamer *No. 2*, which will be used this year for magnetic surveys on the lakes, has been completed, a Mackinaw sailboat has been equipped with motive power, and two new launches have been constructed for use on surveying operations.

The season for survey work on the Great Lakes at the utmost extends from May 15 to November 15, a period of six months, of which the opening and the closing two weeks are usually characterized by rough seas and windy weather. To use the short period available for profitable work in the open lakes to the highest possible advantage requires ample funds and an efficient equipment.

The present approved general project for the operations of the lake survey contemplates the completion of all surveys and other work needed to modernize, improve, and complete the series of charts. The increased demand for charts issued by this office has necessitated a marked increase in the drafting and engraving department. To profitably use the equipment and floating plant and to meet the urgent need of new surveys requires that the field work be prosecuted with the usual vigor.

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Dates and amounts of appropriations for surveys of Northern and Northwestern Lakes.

March 3, 1841	$15,000	March 2, 1868	$77,500
May 18, 1842	20,000	July 20, 1868	75,000
March 1, 1843	30,000	March 3, 1869	100,000
June 17, 1844	20,000	July 15, 1870	100,000
March 3, 1845	20,000	March 3, 1871	175,000
August 8, 1846	25,000	June 10, 1872	175,000
August 12, 1848	25,000	March 3, 1873	175,000
March 3, 1849	10,000	June 23, 1874	175,000
September 28, 1850	25,000	March 3, 1875	150,000
March 3, 1851	25,000	July 31, 1876 (not including $16,000 applied to survey of Mississippi River)	84,000
August 30, 1852	25,000		
March 3, 1853	50,000		
August 5, 1854	50,000		
March 3, 1855	50,000		
August 30, 1856	50,000		
March 3, 1857	50,000		
June 12, 1858	75,000		
March 3, 1859	75,000		
June 21, 1860	75,000		
March 2, 1861	75,000		
July 5, 1862	105,000		
February 9, 1863	106,879		
July 2, 1864	100,000		
February 28, 1865	125,000		
June 12, 1866	50,000		
March 2, 1867	77,500		
		March 3, 1877 (not including $25,000 applied to survey of Mississippi River and including $9,500 received from sale of steamers)	94,500
		June 20, 1878 (not including $49,500 applied to survey of Mississippi River)	49,500
		March 3, 1879	85,000
		June 16, 1880	40,000
		March 3, 1881	18,000
		August 7, 1882	12,000
		Total	2,939,879

Printing and issue of charts for use of navigators and electrotyping copperplates for chart printing.

March 3, 1883	$3,000	March 3, 1893	$2,000
July 7, 1884	3,000	August 18, 1894	2,000
March 3, 1885	3,000	March 2, 1895	2,000
August 4, 1886	2,000	June 11, 1896	2,000
March 3, 1887	2,000	June 4, 1897	2,000
October 2, 1888	2,000	July 1, 1898	3,000
March 2, 1889	2,000	March 3, 1899	3,000
August 30, 1890	2,000	June 6, 1900	3,000
March 3, 1891	2,000		
August 5, 1892	2,000	Total	42,000

Surveys and additions to and correcting engraved plates.

March 2, 1889	$5,000	June 11, 1896	$25,000
August 30, 1890	10,000	June 4, 1897	25,000
March 3, 1891	10,000	July 1, 1898	25,000
August 5, 1892	5,000	March 3, 1899	25,000
March 3, 1893	25,000	June 6, 1900	75,000
August 18, 1894	25,000		
March 2, 1895	25,000	Total	280,000

Surveys, including investigations of lake levels, correcting, printing, and issuing charts and bulletins.

March 3, 1901	$100,000	March 4, 1907	$75,000
June 28, 1902	150,000	May 27, 1908	125,000
March 3, 1903	150,000	March 4, 1909	125,000
April 28, 1904	150,000	June 25, 1910	125,000
March 3, 1905	100,000		
June 30, 1906	75,000	Total	1,175,000

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GGG 2.

PRESERVATION OF NIAGARA FALLS.

At the beginning of the fiscal year operations were in progress under an allotment of $5,000, approved on April 15, 1909, by the Secretary of War, for the purpose of measuring the flow through the canal of the Niagara Falls Hydraulic Power and Manufacturing Company, rating the turbines of the Niagara Falls Power Company, and continuing the study of slopes in the Niagara River.

The field party, under the charge of Junior Engineer Sherman Moore, was engaged on July 1, 1909, in measuring the consumption of water by the plant of the Niagara Falls Power Company. This company cooperated with the Government in conducting a series of tests of the efficiency of its generator units under different operating conditions. This work was suspended temporarily on July 18, and the party was engaged from then until July 30 upon hydraulic measurements in the canal of the Niagara Falls Hydraulic Power and Manufacturing Company.

The value of the data obtained by the observations in the canal of the latter company in 1907, and included in the report of this office, dated November 30, 1908, had been nullified by the enlargement of the canal and by changes in the company's power houses. Obviously, an efficient supervision of the operations of the company under its permit necessitates a knowledge of the approximate amount of water being used. To this end, the party made a series of forty-three determinations of flow through the canal. The section used was at the lower (northern) edge of the Main Street Bridge. While not entirely satisfactory, on account of the proximity of the forebay, the conditions here were better than at either of the sections used in 1907. Two complete sets of soundings were made, giving areas differing by only 0.7 per cent. The section was divided into five panels of 20 feet each, and vertical velocity curves determined in the center of each panel and also 2½ feet from each wall. The observations of discharge were grouped by days and compared with the generated power of the company's turbines, showing a mean diversion of 0.0602 cubic foot per second for each electrical horsepower developed. Owing to the unfavorable conditions in the canal due to an uneven bottom and to the dredging and blasting which were in progress, the results obtained may be 3 or 4 per cent in error. As the present diversion of the company was found to be well within the limit of its permit, no greater accuracy was attempted. Changes in the canal will necessitate further measurements when the water consumption of the Niagara Falls Hydraulic Power and Manufacturing Company approaches its limit under the law. The maximum flow observed in July, 1909, was 3,966 cubic feet per second. At this time several of the mills taking water from the canal or power from the company were shut down. It is probable that measurements taken at other times during the year would have shown a maximum consumption of about 4,500 cubic feet per second. Under its permit the company is allowed to divert 6,500 cubic feet per second from the upper Niagara River.

The hydraulic work on the canal of the Niagara Falls Power Company was resumed on July 31 and continued until August 3, 1909.

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The field party, after a few days' work on the preparation of its report, was then detailed to duties under the appropriation for Survey of Northern and Northwestern Lakes, and was so occupied during the remainder of the year.

The operations of the party during its work upon the canal of the Niagara Falls Power Company were conducted with a view of determining the relation of diversion and the production of power as measured at the switchboard for all reasonable conditions of operation of the company's plant.

Based upon the discharge measurements made in 1907, the officer then in charge of the supervision of operations of power and transmission companies under their War Department permits had imposed upon the Niagara Falls Power Company a limitation to the production of 65,000 horsepower, measured at the switchboard. This limitation was based upon the relation between the actually measured discharges and concurrent switchboard readings, and is believed to have represented with all fairness to the company its full rights under its permit according to the operating conditions then in practice.

Early in the spring of 1909 the company made representations to the effect that a limitation to 65,000 electrical horsepower did not, in fact, at all times and under all operating conditions permit a diversion of 8,600 cubic feet per second, and requested that a series of discharge measurements be made in its intake canal, during the course of which operating conditions might be observed and varied under a prearranged programme designed to establish the mechanical efficiency of various combinations.

A project for the expenditure of an allotment of $5,000 from the appropriation of June 29, 1906, which included a proposed rating of the turbines of the Niagara Falls Power Company, was approved by the Secretary of War on April 15, 1909, as stated above, and the field party began its operations on May 4, 1909. At the beginning of the fiscal year 219 discharge observations had been made, and at the conclusion of the field work, on August 3, 336 measurements of flow in the canal of the Niagara Falls Power Company had been completed. These measurements covered a series of 53 test conditions of operation of the company's plant according to a prearranged programme. A detailed report of this work was submitted to the Chief of Engineers on September 21, 1909. The results of the observations indicate a wide range of efficiency for different openings of the turbine valves and also for the generator units of the two power houses. For instance, the efficiencies determined for the units in power house No. 1 at 50 per cent and 100 per cent valve openings are 34 per cent and 58 per cent, respectively, while the efficiencies in power house No. 2 for the same openings of the gates are 52 per cent and 72 per cent. It is found that the company, operating with the most economical combination of units and valve openings, can generate about 82,000 electrical horsepower, as measured at the switchboard, without exceeding its allowable limit of 8,600 cubic feet per second diversion.

A series of 276 measurements of flow was made in the canal of the International Paper Company, a tenant of the Niagara Falls Power Company, during the progress of the work on the main canal. From the results it appears that the maximum capacity of the paper mill is 725 cubic feet per second. As it is not practicable to maintain a

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constant supervision of the operations of the paper company, its maximum capacity is deducted from the allowable diversion of the Niagara Falls Power Company and the remainder, 7,875 cubic feet per second, is used as a basis for regulating the operations of the latter company. This is apparently satisfactory to all concerned.

From the efficiency curves of the two power houses of the Niagara Falls Power Company the following table was deduced, embodying with as great detail as seemed desirable the practicable operating combinations, and their corresponding switchboard limitations, so that the total diversion of water should in no case exceed the limit prescribed by law.

Operating limitations of Niagara Falls Power Company, effective after September 2, 1909.

Units in operation.			Permissible output.			
			Valve in No. 1 no less than 50 per cent.		Valve in No. 1 no less than 75 per cent.	
Total.	No. 1.	No. 2.	Kilowatts.	Approximate horsepower.	Kilowatts.	Approximate horsepower.
15	4	11	Unlimited.	Unlimited.	Unlimited.	Unlimited.
15	5	10	Unlimited.	Unlimited.	Unlimited.	Unlimited.
15	6	9	Unlimited.	Unlimited.	Unlimited.	Unlimited.
15	7	8	Unlimited.	Unlimited.	Unlimited.	Unlimited.
15	8	7	Unlimited.	Unlimited.	Unlimited.	Unlimited.
16	5	11	60,400	80,900	60,400	80,900
16	6	10	58,600	78,500	58,600	78,500
16	7	9	56,900	76,200	56,900	76,200
16	8	8	55,100	73,800	55,300	74,100
16	9	7	52,600	70,500	53,600	71,800
17	6	11	55,200	74,000	55,200	74,000
17	7	10	53,409	71,600	53,400	71,600
17	8	9	52,100	69,800	52,100	69,800
17	9	8	49,600	66,500	50,600	67,800
18	7	11	49,900	66,900	51,500	69,000
18	8	10	48,200	64,600	50,200	67,300
18	9	9	46,100	61,800	49,000	65,700
19	8	11	45,400	60,800	49,000	65,700
19	9	10	44,000	59,000	48,100	64,500
Operation not limited.			40,000 kilowatts.		53,600 horsepower.	

NOTE.—This schedule is based on 7,875 cubic feet per second of water available in plant of Niagara Falls Power Company and 725 cubic feet per second in the plant of the International Paper Company.

Since September 2, 1909, the company has operated under the limits prescribed by this table. It will be noted that for 18 of the 19 combinations enumerated the switchboard output exceeds 65,000 electrical horsepower, formerly prescribed.

Automatic gauges were maintained throughout the season of 1909 at Grass Island, Horseshoe Falls above the Cataract, Suspension Bridge, and Whirlpool. They were discontinued during the winter on account of ice conditions. In the early spring of 1910 the gauge formerly at Grass Island was installed at Chippewa and the other three gauges were replaced in their former positions.

Since August 14, 1908, the supervision of the operations of the power and transmission companies at Niagara Falls, under their permits, which are briefly summarized on page 895 of the Report of the

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Chief of Engineers for 1908, has been performed by the Lake Survey Office. After the departure of the hydraulic party in August, 1909, this duty was performed by an employee stationed at Niagara Falls, N. Y., who has made inspections at frequent and irregular intervals, the detailed results of such inspections being placed on file in the Lake Survey Office and a summary duly reported to the Chief of Engineers. In so far as the inspections disclose, all of the companies concerned have loyally observed the limitations of their corresponding permits.

To defray the expenses arising in connection with the supervision of operations of power and transmission companies, and to make further investigations of slope relations in the Niagara River and related subjects, the Secretary of War, on June 17, 1910, allotted the additional sum of $1,000 from the appropriation of June 29, 1906.

G G G 3.

REPORT ON THE DETERMINATION OF MAGNETIC VARIATIONS OVER CERTAIN PORTIONS OF LAKE SUPERIOR.

ENGINEER OFFICE, U. S. ARMY,
Duluth, Minn., May 23, 1910.

SIR: It is recommended that the accompanying data be printed in the Annual Report of the Chief of Engineers.

Very respectfully,

GRAHAM D. FITCH,
Lieut. Col., Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

REPORT OF MR. J. H. DARLING, PRINCIPAL ASSISTANT ENGINEER.

COLONEL: I have the honor to submit the following report on the determination of magnetic variations over certain portions of Lake Superior, which were made by me in the years 1903, 1904, and 1906, under the direction of Capt. Charles L. Potter, Corps of Engineers, up to July, 1906, and under your directions in September, 1906.

This work is supplementary to the magnetic determinations made by me in 1902–3 and described in the Annual Report of the Chief of Engineers for 1904, Appendix E E E, pages 4132–4170. That work covered the western portion of Lake Superior from Duluth to Devils Island and Little Marias, and consisted of more than 800 results for variation, systematically located in parallel lines running across the lake and other lines parallel to the shore. These were mapped on sheets accompanying the report cited, and the principal results were shown on a chart published in the United States Lake Survey Bulletins for the years 1904 to 1907, inclusive.

The following work differs from the former in that the lines of observations run were occasional ones only, on the courses of the U. S. steamer *Vidette* while making journeys to various parts of this district for purposes of inspection, and therefore do not have the regular arrangement of the 1902 work, nor are they as numerous, there being about 168 results, and these cover but small portions of the lake. These were taken incidentally and without extra expense, but by the same instruments and methods and with the same care as in 1902, and with the idea that the results would be useful to navigators.

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OUTLINE OF METHODS AND RESULTS.

In what follows the general method of observation will be gone over rather briefly and the reader is referred to my report of 1904 for details. More space will, however, be given to the determination of deviation at Coldwell, where a method was employed which is new in some of its details, and which it is believed may be advantageously followed by other observers under certain conditions.

The United States Navy standard compass was used aboard the *Vidette* with an azimuth circle provided with a small mirror, which threw a pencil of light down on the circle, and the bearing of the sun was noted to degrees and tenths of a degree, and also the time of observation and the heading of the vessel. The observation was usually repeated immediately from two to five times and a mean taken of both the bearings and times, in order to eliminate errors of observation.

The difference between the compass bearing of the sun and the true bearing or azimuth of the sun gives the total error of the compass, and this total error is made up of the sum of the variation (which is the departure of the magnetic meridian from the true meridian), and the deviation (which is the pull of the compass needle by the ship's iron). The deviation was determined by swinging the vessel, and a curve of same platted, so that its amount for all headings was known and for different latitudes. The deviation when subtracted from the total error gives the desired magnetic variation.

Reduction of notes.—For reducing the notes the apparent time of the observation was necessary, which is time measured by the diurnal motion of the sun, noon being the moment when the sun is on the meridian. Azimuth tables are made up with reference to apparent time.

TABLE 1.—*Example of reduction of notes.*

[September 10, 1906. First two observations on line from Bete Grise Bay to Marquette. Sun's declination N. 5° 06'. Latitude and longitude as per chart.]

No. of observation.	1049.	1050.
Observed time, a. m.	9h 01m 30s	9h 15m 00s
Correction for watch	−14s	−14s
Ninetieth meridian time	9h 01m 16s	9h 14m 46s
Longitude correction	+8m 26s	+8m 12s
Local mean time	9h 09m 42s	9h 23m 18s
Equation of time	+2m 54s	+2m 54s
Apparent time	9h 12m 36s	9h 26m 12s
Tabular time, a. m.	9h 15m 00s	9h 25m 00s
Sun's azimuth for tabular time, lat. 47° and dec. 5°	N. 126.6° E.	N. 129.2° E.
Time interpolation	−0.6°	+0.3°
Latitude interpolation	+0.2°	+0.2°
Declination interpolation	−0.1°	−0.1°
Sun's azimuth	N. 126.1° E. or S. 53.9° E.	N. 129.6° E.; S. 50.4° E.
Sun's bearing by compass	S. 53.5° E.	S. 50.0° E.
Total error or variation+deviation	−0.4°	−0.4°
Ship's heading	S. 24° E.	S. 25° E.
Deviation	−2.4°	−2.5°
Variation	+2.0°	+2.1°

In Table 1 the + sign means additive, and the − sign subtractive, when applied to numerical computations. When placed before a total error or a deviation or a variation the + sign means that the north end of the compass needle is pulled to the east, and a − sign means that it is pulled to the west.

Location of position.—For locating the vessel's positions at times of observation, on line from Bete Grise to Marquette, the point of departure was 2¼ miles east of the Mendota light-house, and the course, which was held steady on a previously calculated heading, passed west of Granite Island, leaving Granite

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Island light 1.57 miles to port when abeam, as determined by several bearings of the light from the course. The noting of times of departure, of passing the light, and of each observation, the speed as determined from the speed curve as a function of the revolutions of the propeller per minute, and the occasional reading of the taffrail log, furnished data more than sufficient for the platting of positions on the chart.

DEVIATION OF THE COMPASS.

The compass was uncompensated, but as the vessel was a wooden one the deviation was not large, and was well determined by swinging the ship, with bearings taken to a distant object for different headings and compared with the true magnetic bearing of the same distant object.

Deviation in 1903.—For the observations in 1903 the deviation curves determined that year at Duluth and Grand Marais, Minn., were used, as shown in the second diagram of Sheet V in report of 1904, already cited. It will be noticed that the deviation at Grand Marais, Minn., is some greater than at Duluth, on account of the higher latitude and the diminished horizontal intensity of the earth's magnetism. The ship was also swung for deviation in the same year at Grand Marais, Mich., which is at the other end of the lake, in latitude 46° 41′, which differs only 5′ from the latitude of Duluth, giving a curve which is shown in figure 1 of sheet 2 (herewith). This deviation curve agrees so closely with that at Duluth that it is assumed that the lines of equal deviation for the entire lake are approximately parallel to the parallels of latitude. Accordingly, the deviation for the observations in the year 1903 is assumed to vary uniformly between the latitudes of Duluth and Grand Marais, Minn., and at the same rate beyond these latitudes, so that the deviation for a given point was found by a simple interpolation between the two deviation curves which are shown at the middle of Sheet V of the report of 1904.

Deviation in 1904.—A change in the deviation of the steamer *Vidette* was caused by repairs and alterations to the vessel made in the winter of 1903–04 and by the installation of an electric lighting plant. The deviation was therefore redetermined in 1904.

Deviation at Superior, 1904.—The vessel was swung for deviation in September, 1904, and the resulting curve is shown in figure 2, on sheet 2, it being the smaller one of the pair. Comparing this with the curves for the preceding year in the same latitude it will be seen that there was an increase in the maximum values of the deviation of about 1½° due to the alterations in the vessel.

The deviation was determined by the bearing of a distant object. The vessel was swung around a pile cluster and steadied on each second point, making 16 equidistant points, with a few intermediate observations. The magnetic bearing of the distant object was found by setting the same compass upon the pile cluster with the ship away at a distance. The observed values for deviation are shown by the black dots. A smooth curve was drawn to eliminate errors of observation. Further details of the methods employed in observations and reductions for deviation may be seen in my report of 1904, Chapter III.

Deviation at Coldwell, 1904.—The ship was swung for deviation August 16, 1904, to bring out the effect of change in latitude. The resulting curve is shown in figure 2, sheet 2, it being the larger one of the two curves which are shown together for the purpose of interpolating for intermediate latitudes.

Superior is in latitude 46° 43′, and Coldwell in latitude 48° 44′, which is 2° farther north, and the increase in deviation at Coldwell is 1.3° on an east heading and 1.6° on the west heading. The deviation for intermediate latitudes was obtained by simple interpolation between these two curves.

Method of determining deviation at Coldwell.—At Coldwell there was no suitable distant object ashore, and the sun was used for the distant object. It was taken when at a low latitude, between the hours of 5.14 and 6.02 p. m. The ship's head was brought successively to the cardinal and intercardinal points while working slowly ahead and turning in a circle of something like 1,000 feet diameter. The sun's bearing by azimuth compass was taken on each of these headings, and the difference between each bearing and the sun's true azimuth for the same instant of time (as computed by means of an azimuth table) gives the total error of the compass. Taking the mean of the total errors, for the equidistant headings, eliminates the deviation and gives the variation. Then by subtracting the variation from the total errors the deviations are found. The details of the computation are shown in Tables 2, 3, and 4, which are mostly self-explanatory, but some additional remarks following Table 2 may assist the reader.

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TABLE 2.—*Deviation—At Port Coldwell—Vidette, azimuth compass, August 16, 1904.*

[Sun used for the distant object. + is when north end of needle is pulled to the east; — to the west.]

(1) Ship's head by azimuth compass.		(2) Sun's bearing by azimuth compass.	(3) Sun's true azimuth.	(4) Total error, or variation plus deviation.	(5) Approximate deviation by adding 1.0° to last column.
Points.	°	°	°	°	°
N.	N. 1 E.	N. 82.0 W.	N. 84.2 W.	−2.2	N. −1.2
NE.	N. 43 E.	N. 76.0 W.	N. 83.2 W.	−7.2	NE. −6.2
E.	N. 90 E.	N. 74.5 W.	N. 82.0 W.	−7.5	E. −6.5
SE.	S. 45 E.	N. 75.8 W.	N. 80.4 W.	−4.6	SE. −3.6
S.	S. 0 E.	N. 79.2 W.	N. 78.8 W.	+ .4	S. +1.4
SW.	S. 44 W.	S. 88.0 W.	N. 87.4 W.	+4.6	SW. +5.6
W.	S. 89 W.	−N. 92.0 W. S. 87.8 W.	N. 86.3 W.	+5.9	W. +6.9
NW.	N. 46 W.	−N. 92.2 W. N. 88.2 W.	N. 85.2 W.	+3.0	NW. +4.0
			Mean ...	− .95	+ .05

For the purpose of separating the variation from the deviation in column (4) attention is called to the following fact: When the compass is in the middle fore and aft line of the ship (which is the case with the *Vidette*), then the mean of all the deviations for equidistant points around the compass circle is so small that it may be neglected. (See Adm. Man., p. 51.) This mean is the constant term A in the general formula for deviation:

$$\delta' = A + B \sin Z' + C \cos Z' + D \sin 2Z' + E \cos 2Z'. \quad \text{(Equation 1.)}^a$$

in which Z' is the compass course or ship's heading, and A, B, C, D, and E are coefficients having reference to the several component forces producing deviation.

The term A was actually found to be 0.2° by the swinging at Superior in 1904, but this is practically zero.

Returning to Table 2, the mean of the values in (4) is −0.95°. As the deviation is eliminated from this mean, the quantity −0.95° is the variation for the locality where the vessel was swung. Subtracting −0.95° (or −1.0°) from the values in column (4) gives the values for deviation in column (5). If there were no errors of observation, these values would be final and a curve could be platted from them.

A preliminary plat of the deviation curve from the results in column (5) indicates erroneous observations on the NE. and SE. headings, for reasons unknown, and these are rejected. The remaining results are more consistent. For convenience in computation only the results on the four cardinal points are used. From these the two columns (4) and (5) are recomputed, as in Table 3.

TABLE 3.—*Coldwell deviation*—Continued.

Heading.	Total error, or variation, plus deviation.	Variation.	Resulting deviation, or total error, minus variation.
	°	°	°
N.	−2.2	−0.85	−1.35
E.	−7.5	−0.85	−6.65
S.	+0.4	−0.85	+1.25
W.	+5.9	−0.85	+6.75
	Mean −0.85		Mean 0.00

[a] An explanation of this formula may be seen in Admiralty Manual, p. 50, or briefly in the 1904 report cited, in footnote to p. 4140.

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It remains to compute a deviation table and to draw a curve of deviations. For this purpose equation 1 will be used. The coefficients A and E are so small that they may be neglected. D, which has reference to quadrantal deviation, remains unchanged in all magnetic latitudes, and therefore may be determined from the Superior deviation curve of 1904. Using the approximate method given in Admiralty Manual, page 52, and the superior curve given on sheet 2, figure 2, we find

$$D=\tfrac{1}{2}(-3.7°+4.1°)=+0.2°$$
$$\text{or } \tfrac{1}{2}(+4.4°-2.9°)=+0.8° \quad \text{Mean } D=+0.5°$$

Coefficients B and C vary with the latitude, and of course must be obtained from the Coldwell observations. From Table 3 we find the following approximate values:

$$B=-6.65° \text{ or } -6.75°, \text{ mean } -6.7°$$
$$C=-1.35° \text{ or } -1.25°, \text{ mean } -1.3°$$

With the above coefficients the deviation is computed by the convenient form given in Admiralty Manual, page 61, and Table II, page 193, as in the following Table 4, and the curve deviations given in sheet 2 for Coldwell is platted from the values given in the last column of Table 4:

TABLE 4.—*Computation of deviations at Coldwell, August 16, 1904.*

[S_2 = sin 22½°, S_4 = sin 45°, S_6 = sin 67½°.]

(a)		(b)		(c)		(d)	(e)
Quadrantal deviation. Coeff. D=+0.5°.		Semicircular deviation.				Sum of (b) and (c).	Resulting deviation. (Sum of (a) and (d).)
		Coeff. B=−6.7°.		Coeff. C=−1.3°.			
Multipliers.	Products.	Multipliers.	Products.	Multipliers.	Products.		
0	0.0	0	0.0	1	−1.3	−1.3	N. −1.3
S_4	+ .4	S_2	−2.6	S_6	−1.2	−3.8	NNE. −3.4
1	+ .5	S_4	−4.7	S_4	− .9	−5.6	NE. −5.1
S_4	+ .4	S_6	−6.2	S_2	− .5	−6.7	ENE. −6.3
0	0.0	1	−6.7	0	0.0	−6.7	E. −6.7
$-S_4$	− .4	S_6	−6.2	$-S_2$	+ .5	−5.7	ESE. −6.1
− 1	− .5	S_4	−4.7	$-S_4$	+ .9	−3.8	SE. −4.3
$-S_4$	− .4	S_2	−2.6	$-S_6$	+1.2	−1.4	SSE. −1.8
Upper part of column (a) Products is repeated in lower part.	0.0	Upper part of column (d) is repeated in the lower part with changed signs.				+1.3	S. +1.3
	+ .4					+3.8	SSW. +4.2
	+ .5					+5.6	SW. +6.1
	+ .4					+6.7	WSW. +7.1
	0.0					+6.7	W. +6.7
	− .4					+5.7	WNW. +5.3
	− .5					+3.8	NW. +3.3
	− .4					+1.4	NNW. +1.0

The use of the general formula for computing deviations (as in the foregoing example) is, I believe, the best and only accurate method where the observations are so limited in number. Available time did not permit of more extended observations at Coldwell. It is desirable to take more numerous observations whenever possible, so as to include headings of the ship for every point of the compass. It is not necessary to bring the head to the exact points of the compass, but the observations should be numerous and well distributed. From the observed deviations a smooth curve could then be drawn which probably would suffice for the deviation curve; but if time permitted and the greatest accuracy were desired the reduction could be made by the method of least

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squares, for which a convenient form is given in Admiralty Manual, pages 113, 53, and 61.

This method of least squares supposes observations to be taken on equidistant points of the circle. If they are not so taken and it is desired to employ this method, I would suggest that a preliminary smooth curve be drawn, and values taken from this curve at equidistant points, as at each compass point or double point, and these values treated as observed values. This preliminary curve would in fact furnish a partial adjustment of the deviation.

Deviation in 1906.—After the alterations to the *Vidette*, made in the winter of 1903–4, already mentioned, no further changes were made in the vessel that would affect the deviation until during the winter of 1907–8, when a new boiler was installed and some other changes made. Therefore for the magnetic work done in the season of 1906 the deviation of the standard compass on the *Vidette* was taken to be the same as in 1904, and the curves for 1904 were used in the computation of the variations.

Final results for variation.—The computed values for variation are collected in Table 5, herewith, in which the date, hour, and geographical position of each observation is given, also the observed result and the variation reduced to the year 1910. The number of results is about one hundred and sixty-eight. These are also platted on a chart of Lake Superior, marked sheet 1, herewith, scale 1:1,200,000, except that some of the tabulated values are necessarily omitted to avoid crowding.

An examination of these results reveals a few areas of local attraction of the compass, characterized by rather moderate intensities as compared with some areas which had been developed over the western portion of the lake by the work of 1902.

In the vicinity of the Canadian shore near Pic Island and Peninsula Harbor, where the normal variation is probably between 1° and 2° W., the observed variations run from 6.3° W. to 4.9° E., indicating that the north end of the compass needle is pulled by local attraction 5° to the west at one place and pulled more than 6° to the east at another place. It should be remarked that the observations are not numerous enough and do not cover enough territory to bring out the full extent of the local attraction, and it may therefore much exceed the above figures at other places in that locality. This remark will also apply to other localities where observations are recorded.

Along the shore of Isle Royal some attraction is found. Near the eastern end of the island one of the observations shows a pull of the compass needle of 5° to the east of the normal variation, and a few miles north of the west end there is a pull of 3° to the east. These are maximum amounts of the disturbance as shown by the observations.

About 9 miles east of Grand Marais, Minn., and 1½ miles from shore, the north end of the needle is pulled about 7° to the east of the normal amount by local attraction, and about 2 miles south of the harbor entrance a pull of 4° to the east was observed. There is known to be a very pronounced disturbance of the needle on land near this harbor. (See report of 1904, Sheet XI.)

Near the Stannard Rock light a pull of the compass 3° or 4° to the east is indicated. Near Marquette there is a slight pull to the east amounting to 1½° or 2°, and the writer has observed local attraction ashore at Marquette on a former occasion.

Some of the smaller differences in the platted results must, of course, be due to unavoidable errors of observation and reduction, including the determina- of the sun's compass bearing while aboard a vessel in motion, and the determination of the ship's deviation. It is believed that the errors in the tabulated results are usually less than one-half of a degree, but that they might amount in some instances to 1 degree.

Local attraction is most noticeable in localities near shore, where the water is shoal or of moderate depth. No large attraction has been observed over the deeper portions of the lake. It may be that the mineral bodies which attract the needle are as prevalent in the earth under the bed of the lake as in the dry land, but as the intensity of the force of the magnetic attraction diminishes proportionally with the square of the distance, the effect would be much less where there was several hundred feet of water intervening beneath the compass.

Lake Superior is a deep body of water, with one sounding of more than 1,000 feet. The main course of vessels lies over generally deep water, and this is favorable for navigation, as a normal variation is more likely to be found.

It would be useful if the entire body of the lake could be covered with observed variations and charted, so that the variations along any particular

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route could be used for figuring the compass course of a vessel, and the areas of local attraction, usually nearer shore, could be seen by the pilot and guarded against.

The present observations fall far short of completely covering the lake, as a glance at the accompanying chart will show, but the results, meager as they are, will, it is believed, prove to be a considerable aid to the navigation of Lake Superior. The master can make use of the variations which fall nearest to his course, taking the average of a number of them, and when there are variations platted on each side of the course an interpolated variation can be estimated.

The isogonic lines drawn on sheet 1 are intended to represent approximately the normal variation of Lake Superior, as indicated by these observations. In drawing them the small areas of local attraction were disregarded.

I have been assisted in the reduction of the within magnetic observations by Mr. T. Russell, U. S. assistant engineer, of the United States Lake Survey Office, Detroit.

TABLE 5.—*Variations of the compass on Lake Superior.*

[As observed with a U. S. Navy standard compass and a U. S. Navy azimuth circle aboard the U. S. steamer *Vidette*, in the years 1903–4 and 1906, by J. H. Darling, principal assistant engineer, Duluth district. Reduction to 1910 with annual change of 2.0′, west variations increasing with time, east variations diminishing. Variations marked with a star are omitted from the chart (sheet 1) in order to avoid crowding.]

PORTAGE ENTRY TO GRAND MARAIS, MICH.

Date.	Time, ninetieth meridian.	Latitude.	Longitude.	Observed variation.	Variation 1910.	Remarks and references.
		° ′	° ′	°	°	
1903. July 22	5.18 a. m.	46 56.0	87 21.0	E. 1.0	E. 0.8	
	6.01 a. m.	46 55.0	87 11.0	E. 1.3	E. 1.1	
	6.16 a. m.	46 54.0	87 08.0	E. 1.3	E. 1.1	
	7.02 a. m.	46 53.0	86 57.0	E. 2.4	E. 2.2	
	8.03 a. m.	46 52.0	86 44.0	E. 0.3	E. 0.1	
	9.03 a. m.	46 50.0	86 30.0	W. 2.0	W. 2.2	
	9.57 a. m.	46 48.0	86 18.0	W. 0.8	W. 1.0	
	.....	46 40.0	85 58.7	.....	.....	Grand Marais inner light.

GRAND MARAIS, MICH., TO GRAND ISLAND.

1903. July 23	7.00 a. m.	46 42.0	86 07.0	E. 0.6	E. 0.4	
	7.32 a. m.	46 40.0	86 13.0	W. 0.2	W. 0.4	
	8.05 a. m.	46 37.0	86 21.0	W. 0.4	W. 0.6	
	8.28 a. m.	46 35.0	86 26.0	W. 0.6	W. 0.8	
	9.09 a. m.	46 34.0	86 28.0	W. 0.9	W. 1.1	
	10.02 a. m.	46 30.0	86 34.0	0.0	W. 0.2	
	10.26 a. m.	46 28.0	86 36.0	E. 1.0	E. 0.8	
	11.17 a. m.	46 30.0	86 43.0	E. 1.8	E. 1.6	

GRAND ISLAND TO MARQUETTE.

1903. July 23	1.20 p. m.	46 33.0	87 03.0	E. 2.2	E. 2.0	
	1.23 p. m.	46 33.0	87 04.0	E. 1.9	E. 1.7	
	1.59 p. m.	46 32.0	87 12.0	E. 2.1	E. 1.9	
	2.29 p. m.	46 32.0	87 19.0	E. 1.7	E. 1.5	

GULL ROCK TO ISLE ROYAL.

1903. July 24	7.12 a. m.	47 28.0	87 42.0	E. 0.7	E. 0.5	
	7.33 a. m.	47 31.0	87 44.0	E. 0.9	E. 0.7	
	8.37 a. m.	47 38.0	87 51.0	E. 1.2	E. 1.0	
	.....	47 25.3	87 40.0	.....	.....	Gull Rock light.

ROCK HARBOR, ISLE ROYAL, HALF MILE EAST OF OLD LIGHT-HOUSE.

1903. July 25	5.00 p. m.	48 07.0	88 34.0	E. 1.6	E. 1.4	Mean of results at 3 p. m. and 7 p. m.

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TABLE 5.—*Variations of the compass on Lake Superior*—Continued.

McCARGOE COVE (ISLE ROYAL) TO GRAND MARAIS, MICH.

Date.	Time, ninetieth meridian.	Latitude.	Longitude.	Observed variation.	Variation 1910.	Remarks and references.
		° ′	° ′	°	°	
1903. July 27	7.12 a. m.	48 07.0	88 42.0	E. 3.0	E. 2.8	
	7.30 a. m.	48 06.0	88 45.0	E. 2.1	E. 1.9	
	8.03 a. m.	48 05.0	88 53.0	E. 2.7	E. 2.5	
	8.38 a. m.	48 03.0	89 01.0	E. 1.6	E. 1.4	
	9.08 a. m.	48 01.0	89 06.0	E. 3.7	E. 3.5	
	9.34 a. m.	47 59.0	89 12.0	E. 3.9	E. 3.7	
	10.02 a. m.	47 58.0	89 16.0	E. 6.3	E. 6.1	
	10.30 a. m.	47 56.0	89 22.0	E. 3.7	E. 3.5	
	11.38 a. m.	47 53.0	89 37.0	E. 2.5	E. 2.3	
	12.00 m.	47 52.0	89 42.0	E. 3.6	E. 3.4	
	12.14 p. m.	47 51.0	89 45.0	E. 3.1	E. 2.9	
	2.58 p. m.	47 43.5	90 19.8	E. 8.9	E. 8.7	
	3.02 p. m.	47 43.8	90 19.9	E. 7.2	E. 7.0	
	3.02 p. m.	47 43.9	90 19.9	E. 4.5	E. 4.3	
	3.03 p. m.	47 44.0	90 19.9	E. 7.1	E. 6.9	
	3.05 p. m.	47 44.4	90 20.0	E. 5.3	E. 5.1	
	.....	47 44.7	90 20.1	.....	.....	Grand Marais, Minn., east breakwater light.
	LA POINTE LIGHT TO ONTONAGON.					
1903. Aug. 21	2.38 p. m.	46 45.0	90 42.0	E. 5.2	E. 5.0	
	2.58 p. m.	46 45.0	90 38.0	E. 4.7	E. 4.5	
	3.58 p. m.	46 47.0	90 24.0	E. 3.8	E. 3.6	
	5.08 p. m.	46 48.0	90 10.0	E. 2.7	E. 2.5	
	5.55 p. m.	46 49.0	89 58.0	E. 3.3	E. 3.1	
	6.50 p. m.	46 51.0	89 47.0	E. 4.2	E. 4.0	
	6.59 p. m.	46 51.0	89 44.0	E. 3.9	E. 3.7	
	.....	46 43.7	90 47.5	.....	.....	La Pointe light.
	STANNARD ROCK TO GRAND MARAIS, MICH.					
1903. Aug. 23	10.16 a. m.	47 11.0	87 14.0	E. 4.5	E. 4.3	
	10.33 a. m.	47 09.0	87 12.0	E. 2.5	E. 2.3	
	10.58 a. m.	47 08.0	87 07.0	E. 0.6	E. 0.4	
	11.32 a. m.	47 05.0	87 00.0	E. 1.9	E. 1.7	
	12.36 p. m.	47 00.0	86 48.0	W. 0.4	W. 0.6	
	1.59 p. m.	46 54.0	86 32.0	W. 2.5	W. 2.7	
	.....	47 11.0	87 13.6	.....	.....	Stannard Rock light.
	OFF PORTAGE CANAL, 2 MILES WEST OF UPPER ENTRANCE.					
1903. Aug. 27	9.24 a. m.	47 14.5	88 40.7	E. 4.0	E. 3.8*	
	.....	47 14.0	88 37.7	.....	.....	Upper entrance main light (ashore).
	ONTONAGON TO UPPER ENTRANCE OF PORTAGE CANAL.					
1904. Aug. 11	9.27 a. m.	46 59.0	89 10.0	E. 3.4	E. 3.2	
	9.36 a. m.	47 00.0	89 09.0	E. 3.8	E. 3.6*	
	9.45 a. m.	47 01.0	89 07.0	E. 3.4	E. 3.2	
	10.18 a. m.	47 04.0	89 02.0	E. 3.7	E. 3.5	
	11.03 a. m.	47 08.0	88 53.0	E. 3.1	E. 2.9	
	11.55 a. m.	47 13.0	88 45.0	E. 3.1	E. 2.9	
	12.19 p. m.	47 15.0	88 41.0	E. 3.3	E. 3.1	
	WHITEFISH POINT TO QUEBEC HARBOR, MICHIPICOTEN ISLAND.					
1904. Aug. 15	8.19 a. m.	46 50.0	84 59.0	W. 2.6	W. 2.2	
	9.09 a. m.	46 56.0	85 04.0	W. 2.3	W. 2.5	
	9.29 a. m.	46 58.0	85 06.0	W. 1.8	W. 2.0	
	10.00 a. m.	47 03.0	85 10.0	W. 2.3	W. 2.5	
	10.32 a. m.	47 06.0	85 14.0	W. 1.3	W. 1.5	
	10.59 a. m.	47 10.0	85 17.0	W. 1.6	W. 1.8	
	11.37 a. m.	47 14.0	85 21.0	W. 1.3	W. 1.5	
	12.06 a. m.	47 16.0	85 22.0	W. 1.5	W. 1.7	
	12.34 p. m.	47 20.0	85 26.0	W. 0.7	W. 0.9	

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TABLE 5.—*Variations of the compass on Lake Superior*—Continued.

WHITEFISH POINT TO QUEBEC HARBOR, MICHIPICOTEN ISLAND—Continued.

Date.	Time, ninetieth meridian.	Latitude.	Longitude.	Observed variation.	Variation 1910.	Remarks and references.
1904.		° ′	° ′	°	°	
Aug. 15	12.59 p. m.	47 24.0	85 29.0	E. 0.4	E. 0.2	
	1.27 p. m.	47 28.0	85 33.0	E. 0.6	E. 0.4	
	2.02 p. m.	47 34.0	85 38.0	E. 0.3	E. 0.1	
	2.32 p. m.	47 39.0	85 43.0	W. 0.5	W. 0.7	
	2.58 p. m.	47 41.0	85 45.0	0.0	W. 0.2	
	.....	46 46.4	84 57.3	.....	.....	Whitefish Point light.

MICHIPICOTEN ISLAND TO PORT COLDWELL.

1904.						
Aug. 16	11.56 a. m.	48 06.0	86 11.0	W. 1.3	W. 1.5	
	12.30 p. m.	48 11.0	86 12.0	W. 3.1	W. 3.3	
	12.58 p. m.	48 14.0	86 14.0	W. 1.8	W. 2.0	
	2.00 p. m.	48 23.0	86 18.0	W. 1.5	W. 1.7	
	2.29 p. m.	48 27.0	86 19.0	W. 1.5	W. 1.7	
	2.58 p. m.	48 30.0	86 20.0	W. 1.2	W. 1.4	
	3.30 p. m.	48 35.0	86 22.0	W. 2.4	W. 2.6	
	4.00 p. m.	48 40.0	86 24.0	W. 3.2	W. 3.4	

JUST OUTSIDE COLDWELL HARBOR, ONTARIO.

[Moving in a circle about 1,000 feet in diameter, vessel heading successively on the 8 cardinal and intercardinal points.]

1904.						
Aug. 16	5.14 p. m.	.....	.....	W. 1.4	W. 1.6*	Heading SW.
	5.20 p. m.	.....	.....	W. 0.8	W. 1.0*	Heading W.
	5.26 p. m.	.....	.....	W. 0.4	W. 0.6*	Heading NW.
	5.32 p. m.	.....	.....	W. 0.9	W. 1.1*	Heading N.
	5.37 p. m.	.....	.....	W. 2.3	W. 2.5*	Heading NE.
	5.43 p. m.	.....	.....	W. 0.7	W. 0.9*	Heading E.
	5.53 p. m.	.....	.....	W. 0.1	W. 0.3*	Heading SE.
	6.01 p. m.	.....	.....	W. 0.9	W. 1.1*	Heading S.
Means.	.....	48 44.0	86 28.0	W. 0.9	W. 1.1*	

COLDWELL TO JACKFISH.

1904.						
Aug. 17	3.17 p. m.	48 43.9	86 26.0	W. 1.5	W. 1.7*	
	3.21 p. m.	48 43.2	86 26.0	W. 1.6	W. 1.8	
	3.33 p. m.	48 41.7	86 26.0	W. 2.4	W. 2.6	
	3.35 p. m.	48 41.2	86 26.0	W. 3.6	W. 3.8*	
	3.48 p. m.	48 39.7	86 27.0	W. 6.1	W. 6.3	
	3.51 p. m.	48 39.8	86 28.0	W. 1.4	W. 1.6*	
	4.00 p. m.	48 40.0	86 30.3	E. 0.2	0.0	
	4.10 p. m.	48 40.1	86 32.7	E. 5.1	E. 4.9	Abreast Pie Island.
	4.15 p. m.	48 40.1	86 33.7	E. 2.1	E. 1.9*	Do.
	4.19 p. m.	48 40.2	86 35.0	E. 1.2	E. 1.0	Do.
	4.28 p. m.	48 41.0	86 39.0	E. 4.1	E. 3.9	
	4.41 p. m.	48 41.3	86 40.0	E. 4.1	E. 3.9*	
	4.46 p. m.	48 41.5	86 41.0	E. 3.3	E. 3.1	
	5.02 p. m.	48 42.5	86 44.7	E. 1.5	E. 1.3	
	5.19 p. m.	48 43.6	86 48.7	W. 0.2	W. 0.4	
	5.29 p. m.	48 44.1	86 50.9	0.0	W. 0.2	
	5.34 p. m.	48 44.5	86 52.0	E. 0.5	E. 0.3*	
	5.42 p. m.	48 45.0	86 53.7	0.0	W. 0.2	
	5.52 p. m.	48 45.5	86 56.1	E. 0.2	0.0	
	.....	48 42.2	86 22.2	.....	.....	Peninsula Harbor light.

M'CARGOE COVE TO GRAND MARAIS, MINN.

1904.						
Aug. 20	6.01 p. m.	47 47.0	90 04.6	E. 1.6	E. 1.4	12.5 miles from Grand Marais.
	6.05 p. m.	47 47.0	90 05.5	E. 2.0	E. 1.8*	
	6.12 p. m.	47 47.0	90 06.8	E. 3.7	E. 3.5	
	6.21 p. m.	47 46.0	90 08.5	W. 2.8	W. 3.0	
	6.24 p. m.	47 46.0	90 09.5	E. 1.6	E. 1.4*	
	6.29 p. m.	47 46.0	90 10.3	E. 2.6	E. 2.4	
	6.35 p. m.	47 46.0	90 11.5	E. 3.8	E. 3.6*	
	6.41 p. m.	47 45.0	90 12.5	E. 1.3	E. 1.1	6.2 miles from Grand Marais.

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TABLE 5.—*Variations of the compass on Lake Superior*—Continued.

STANNARD ROCK TO MARQUETTE.

Date.	Time, ninetieth meridian.	Latitude.	Longitude.	Observed variation.	Variation 1910.	Remarks and references.
1906.		° ′	° ′	°	°	
July 14	9.12 a. m.	47 04.0	87 15.0	E. 2.9	E. 2.8	
	9.40 a. m.	47 00.0	87 16.0	E. 1.7	E. 1.6	
	10.27 a. m.	46 53.0	87 18.0	E. 1.7	E. 1.6	

EAST END OF ISLE ROYAL AND M'CARGOE COVE.

1906.						
July 17	10.41 a. m.	48 09.4	88 23.0	E. 2.3	E. 2.2	
	11.09 a. m.	48 11.5	88 27.0	E. 2.8	E. 2.7	
	11.22 a. m.	48 11.5	88 29.3	E. 1.9	E. 1.8	
	5.00 p. m.	48 06.5	88 41.3	E. 3.7	E. 3.6	

NORTH SIDE OF ISLE ROYAL AND WASHINGTON HARBOR.

1906.						
July 20	3.45 p. m.	47 55.6	89 13.0	E. 3.9	E. 3.8	
	3.58 p. m.	47 54.0	89 12.3	E. 2.6	E. 2.5	
	5.34 p. m.	47 53.7	89 12.2	E. 2.6	E. 2.5	
	5.37 p. m.	47 53.5	89 12.8	E. 2.5	E. 2.4*	
	.....	47 52.1	89 18.7	.....	.....	Rock of Ages light.

ISLE ROYAL, EAST END, TO KEWEENAW POINT AND BETE GRISE BAY.

1906.						
Sept. 9	10.27 a. m.	48 12.0	88 28.3	E. 7.2	E. 7.1*	
	10.33 a. m.	48 12.0	88 26.5	E. 3.3	E. 3.2*	
	10.40 a. m.	48 10.9	88 24.0	E. 2.3	E. 2.2*	
	11.00 a. m.	48 09.5	88 22.6	E. 2.0	E. 1.9*	
	11.10 a. m.	48 08.1	88 21.5	E. 2.6	E. 2.5	
	2.45 p. m.	47 42.0	87 56.5	E. 1.9	E. 1.8	
	2.59 p. m.	47 40.4	87 55.0	E. 1.7	E. 1.6	
	3.14 p. m.	47 38.3	87 53.6	E. 1.6	E. 1.5	
	3.31 p. m.	47 36.5	87 51.8	E. 1.7	E. 1.6	
	3.45 p. m.	47 34.5	87 49.5	E. 1.5	E. 1.4	
	4.00 p. m.	47 32.8	87 48.0	E. 1.2	E. 1.1	
	4.14 p. m.	47 30.5	87 45.9	E. 1.4	E. 1.3	
	4.37 p. m.	47 28.1	87 43.7	E. 0.8	E. 0.7	
	4.59 p. m.	47 25.6	87 41.2	E. 0.7	E. 0.6	
	5.35 p. m.	47 22.1	87 45.5	E. 1.6	E. 1.5	
	5.43 p. m.	47 22.1	87 47.5	E. 1.0	E. 0.9*	
	6.02 p. m.	47 22.1	87 51.1	E. 1.0	E. 0.9	
	.....	47 25.3	87 40.0	.....	.....	Gull Rock light.

BETE GRISE BAY TO PRESQUE ISLE, MARQUETTE.

1906.						
Sept. 10	9.01 a. m.	47 21.0	87 53.4	E. 2.0	E. 1.9	
	9.15 a. m.	47 19.4	87 52.0	E. 2.1	E. 2.0	
	9.30 a. m.	47 17.5	87 51.0	E. 2.4	E. 2.3	
	9.45 a. m.	47 16.0	87 49.7	E. 2.5	E. 2.4	
	10.00 a. m.	47 13.8	87 48.0	E. 2.1	E. 2.0	
	10.30 a. m.	47 10.5	87 45.6	E. 1.6	E. 1.5	
	1.45 p. m.	46 45.3	87 28.5	E. 2.3	E. 2.2	
	2.16 p. m.	46 40.9	87 25.4	E. 3.7	E. 3.6	
	2.30 p. m.	46 39.3	87 24.5	E. 2.0	E. 1.9	
	2.44 p. m.	46 38.0	87 23.3	E. 1.7	E. 1.6	
	3.00 p. m.	46 35.1	87 21.5	E. 3.1	E. 3.0	
	.....	46 43.3	87 24.8	.....	.....	Granite Island light.

Very respectfully,

J. H. DARLING,
Principal Assistant Engineer.

Lieut. Col. GRAHAM D. FITCH,
Corps of Engineers, Duluth, Minn.

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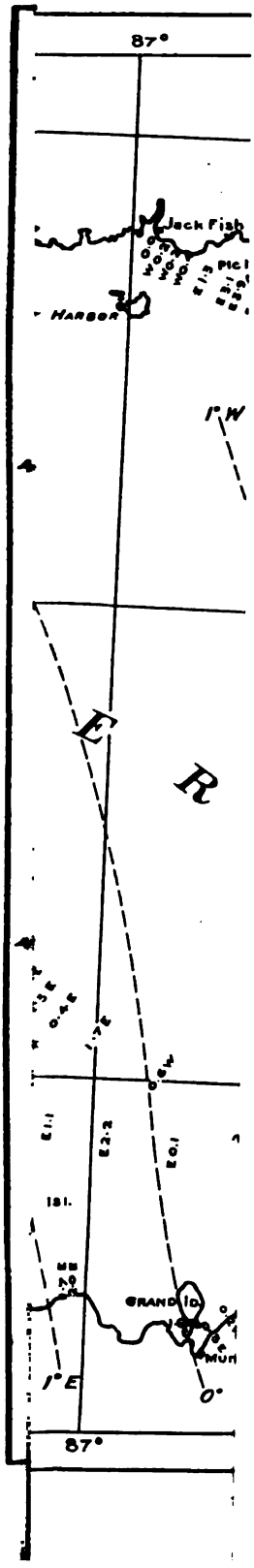

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APPENDIX H H H.

IMPROVEMENT OF YELLOWSTONE NATIONAL PARK, INCLUDING THE CONSTRUCTION, REPAIR, AND MAINTENANCE OF ROADS AND BRIDGES.

REPORT OF CAPT. WILDURR WILLING, CORPS OF ENGINEERS, OFFICER IN CHARGE FOR THE FISCAL YEAR ENDING JUNE 30, 1910.

UNITED STATES ENGINEER OFFICE,
Yellowstone Park, Wyo., July 12, 1910.

SIR: I have the honor to forward herewith my annual report for the fiscal year ending June 30, 1910, for the improvement of Yellowstone National Park.

Very respectfully,

WILDURR WILLING,
Captain, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

The work during the last fiscal year ending June 30, 1910, was executed under the appropriations of March 4, 1909, and June 25, 1910, and consisted of maintenance and repair of the roads and bridges already built, together with a few minor improvements.

GARDINER ENTRANCE.

The trees, shrubs, vines, and lawns about the entrance were maintained throughout the tourist season, and with the advent of winter were protected from the severe weather where necessary.

MAMMOTH HOT SPRINGS.

The maintenance of lawns and shrubbery was continued throughout the summer, and all trees and shrubs liable to winterkill or to injury by game or stray stock were protected by suitable tree guards and movable wire fences upon the approach of winter.

PLANT.

All sprinkling wagons in the park, together with the graders, wagons, tools, etc., were thoroughly inspected and the necessary repairs made. Such tools and implements as were necessary to replace those worn out in service were purchased.

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SPRINKLING.

The length of road sprinkled at present is approximately 85 miles. Improvements in the plant are being made continually. As fast as the available funds permit additional gravity tanks for filling the sprinklers are being installed.

An estimate was made at the close of the season of 1909 for the extension of the sprinkling system from the Gibbon River to the Firehole River, on the Norris-Fountain road; also from the west boundary to the main belt line via the two branch roads up the Gibbon and Firehole rivers, in all over 29 miles of road. Traffic over the west road has increased enormously since the Oregon Short Line extended its terminus to the park boundary, and tourists who enter by this approach should be given the same comforts in the way of sprinkled roads as those who enter by the Northern Pacific approach.

BRIDGES AND CULVERTS.

During the season of 1909, after June 30, numerous minor repairs were made to the bridges throughout the park. It was necessary to replace many of the small wooden bridges with new bridges of cut poles. All but two of the iron bridges were thoroughly painted, and redecking was done wherever necessary.

The unsightly break in the parapet of the Golden Gate Viaduct was repaired.

The temporary bridge over Obsidian Creek was overhauled.

Two bays of the wooden truss bridge over the Buffalo Fork of Snake River were restored and the piers put in good repair.

A careful inspection was made of all wooden bridges on the main belt line during September, 1909, and detailed plans and estimates made for new bridges wherever necessary. Many of these bridges were constructed in the early nineties and they have reached the danger stage in their lives. It is intended to replace four of these by steel bridges during 1910 and the remainder as fast as funds become available.

Plans and estimates for a handsome reenforced concrete bridge over the Firehole River at Riverside Geyser at the Upper Geyser Basin were drawn up. This is one of the most frequented points of interest in the park, and it is desirable that a bridge of esthetic design be constructed.

A number of washouts occurred during the melting of the snow in the spring of 1910, owing to the decay and collapse of old wooden culverts. It is intended to continue to replace these by culverts of vitrified pipe and to also introduce reenforced concrete for this purpose.

GENERAL REPAIRS.

A party of twelve men with three teams worked throughout July, 1909, in making repairs to the East road from the park boundary to Yellowstone Lake.

A party of eleven men with two teams was engaged from July 11 until July 24, 1909, in making minor repairs to the South road from the Thumb to the park boundary.

A party of about twelve men with four teams worked throughout the summer in making the necessary repairs to the road from Mammoth Hot Springs to Tower Falls, and from the latter place to the park boundary over the Cooke City road.

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Considerable emergency work was rendered necessary along the Lake Thumb and the Canyon Lake roads in July, 1909, owing to high water in Yellowstone Lake and Yellowstone River. The road was under water in two places along the lake, and it was necessary to make a temporary detour for about a week. Substantial timber retaining and revetment walls were built during the working season and the road raised about 2 feet. The road at Alum, Trout, and Antelope creeks along the Yellowstone River was slightly under water; these portions of the road were afterwards also raised about 2 feet.

The road over Mount Washburn was opened to traffic about July 15 by a party of fourteen men with four teams. A large amount of rock slide was encountered along the steep mountain side and a small amount of snow on the summit of the mountain. There were also a number of bad washouts from the melting snow.

In August and September, 1909, a party of fifteen men with four teams was engaged in making repairs to the western approach, including its two branches.

The main belt line was worked on throughout the summer by small parties. On and after rainy days the sprinkling crews attended to these repairs, which consisted in filling ruts, cleaning ditches, grading and dragging the roads. About seventy men and forty-six teams were engaged throughout the summer in sprinkling and making these minor repairs.

A party of about fifteen men with four teams was engaged during portions of June and July, 1909, in putting the Mammoth Hot Springs-Norris road in good repair.

Rock and earth slides continue to occur on the Gardiner road and are removed from time to time.

In the spring of 1910 the road from Gardiner to Mammoth Hot Springs was thoroughly resurfaced. The roads around Mammoth Hot Springs were also resurfaced and put in excellent condition for the tourist season.

Early in June, 1910, the road around Bunsen Peak was put in repair for the season.

OPENING OF THE ROADS.

The tourist season of 1910 opened June 15 and the main belt line was naturally free from snow on the Continental Divide for the passage of the first coaches. The season of 1910 was thus opened ten days later than that of 1909.

The spring of 1910 was a mild one; the snow, though heavy, went gradually, and there was little difficulty experienced on account of washouts. Very little rain fell in May and June, and the roads, though dusty earlier in the season than usual, escaped the cutting up usual at this season.

LIVE STOCK.

Steps were taken at the close of the last tourist season looking toward the gradual accumulation by the department of its own animals for work in the park. It is thought a considerable saving can be effected in this way and the department rendered free from the uncertainties incident upon hiring stock in a sparsely settled country.

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APPENDIX III.

ROAD INTO MOUNT RAINIER NATIONAL PARK.

UNITED STATES ENGINEER OFFICE,
Seattle, Wash., July 15, 1910.

SIR: I have the honor to forward herewith annual report for the fiscal year ending June 30, 1910, on road into Mount Rainier National Park.

Very respectfully, your obedient servant,

C. W. KUTZ,
Major, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

ROAD INTO MOUNT RAINIER NATIONAL PARK.

The close of the season of 1910 will see the wagon road to the Camp of the Clouds practically completed, and the estimate submitted is for maintenance only.

This estimate of $200 a mile may appear high, but, considering the mountainous character of the country, the damage from snowslides, and the fact that the road is new and surfaced only with such natural material as can be found close to the road, it is not extravagant.

Practically 6,000 tourists visited the park last year, entering by the government road, and the automobiles numbered 463.

The park regulations restrict automobiles to that part of the road below Nisqually Glacier, and it is questionable whether they can safely be permitted to go beyond this point unless the road is widened and protected on the cliff sides by a masonry guard wall.

This will require an enlargement of the existing project and an additional appropriation, both of which appear to be fully justified by the constantly increasing use that is made of the facilities already offered.

Estimate of additional funds required.

Amount that can be profitably expended in fiscal year ending June 30, 1912, for maintenance of improvement	$5,000.00

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APPENDIX J J J.

CONSTRUCTION OF BRIDGE ACROSS MISSISSIPPI RIVER AT FORT SNELLING, MINNESOTA.

REPORT OF MAJ. FRANCIS R. SHUNK, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1910.

The approved project will be found in the Report of the Chief of Engineers for 1910, Part 1, page 1059.

Work on the approaches was carried on as far as possible until the street at the St. Paul end of the bridge shall be opened up and graded by the city. This work is now about 80 per cent completed. It is expected that the street will be graded in the near future and the work can then be completed. Details are as follows:

Fort Snelling end: One hundred and sixty cubic yards of gravel and crushed stone were laid and rolled; 80 linear feet of concrete curbing and 480 square feet of concrete sidewalk were made and laid. This approach is completed.

St. Paul end: Nine thousand three hundred cubic yards of filling were placed; 2,595 linear feet of concrete curbing and 1,175 linear feet of concrete sidewalk, 8 feet wide, were made and laid; 2 catch basins were built; 800 linear feet of roadway, 30 feet wide, were macadamized, using 1,290 cubic yards of crushed stone and 280 cubic yards of screenings; the boulevards were sown with grass seed; and the boundaries of the United States property were marked with permanent concrete monuments.

Work was suspended early in November, 1909, and the bridge placed in charge of a custodian.

Statement of expenditures during the year.

Bridge:		
Substructure (supplemental contract)	$1,320.22	
Superstructure	465.70	
		$1,785.92
Approaches:		
Sewers, ditches, and tiling	626.15	
Grading	6,645.69	
Macadamizing	2,784.82	
Curbing	1,973.96	
Sidewalk and boulevards	2,326.54	
		14,357.16
Care of bridge and property		306.99
Administration and St. Paul office expenses		2,175.76
Total		18,625.83

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APPROPRIATIONS.

March 4, 1907		$125,000
March 4, 1909		20,000
June 25, 1910		1,200
Other funds:		
From city of St. Paul	$100,000	
From Twin City Rapid Transit Company	25,000	
		125,000
Total		271,200

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APPENDIX K K K.

RECONSTRUCTION OF UNITED STATES BRIDGE AT NIOBRARA, NEBRASKA.

REPORT OF MAJ. EDWARD H. SCHULZ, CORPS OF ENGINEERS, FOR THE YEAR ENDING JUNE 30, 1910.

Funds for this work were appropriated by act of Congress approved April 30, 1908 (Public, No. 104), Indian appropriation act, as follows:

For the purpose of rewooding and repiling the present old bridge across Niobrara River between the Santee and Ponca reservations, Nebraska, supplying the same with new ice breaks, but using the iron work of the old combination bridge, the sum of twelve thousand dollars, or so much thereof as may be necessary, the work to be done under the direction and supervision of the War Department.

In accordance with approval of the Secretary of War, July 6, 1908, the work was assigned to this office.

The bridge was completed April 28, 1909, and the balance of funds on hand at the end of the fiscal year was expended in incidental expenses connected with the work during the early part of the present fiscal year.

APPROPRIATION.

April 30, 1908	$12,000

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APPENDIX L L L.

MONUMENT TO COMMEMORATE THE BATTLE OF KINGS MOUNTAIN, SOUTH CAROLINA.

REPORT OF CAPT. E. M. ADAMS, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1910.

The construction of this monument, under contract, had been nearly completed at the beginning of the fiscal year. The work of carving was completed in July, but the contractor's report of final completion by the placing of the bronze tablets and erection of the fence was not made until December. Upon inspection, minor defects were noted, which the contractor corrected, and after another inspection, made in January, final settlement was made under the contract. The architects were paid for original plans and specifications, and an unexpended balance of $1,201.51 was restored to the Treasury.

APPROPRIATION.

June 16, 1906 ..... $30,000

CONTRACTS IN FORCE.

Name of contractor: Original, the Southern Marble and Granite Company; supplemental, the Southern Marble and Granite Company.
Contract: Original, for monument 115 feet 3 inches high; supplemental, for monument 83 feet 6 inches high, with lightning conductor.
Date of contract: Original, June 4, 1908; supplemental, December 26, 1908.
Date of beginning: Original, July 19, 1908; supplemental, upon approval.
Date of expiration: Original, March 19, 1909; supplemental, June 30, 1909.

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APPENDIX M M M.

MONUMENT TO COMMEMORATE THE BATTLE OF THE REVOLUTION FOUGHT AT POINT PLEASANT, WEST VIRGINIA.

REPORT OF CAPT. F. W. ALTSTAETTER, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1910.

The erection of the granite monument in Tu-endi-wei Park, Point Pleasant, W. Va., in accordance with the public building act of May 30, 1908, was completed in November, 1909.

The following work was done during the fiscal year: The lower courses, shaft, bronze tablets, and the "Frontiersman" statue were placed. On July 22, a storm wrecked the cribbing used in erecting the monument, but no damage was done to the permanent work. The monument was accepted on the part of the Government November 26, it haveing been unveiled by the people of Point Pleasant on October 9.

APPROPRIATION.

May 30, 1908---------- $10,000

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APPENDIX N N N.

ERECTION OF MONUMENT AT MONTEREY, CALIFORNIA, TO COMMEMORATE THE TAKING POSSESSION OF THE PACIFIC COAST BY THE LATE COMMODORE JOHN D. SLOAT, UNITED STATES NAVY.

REPORT OF LIEUT. COL. JOHN BIDDLE, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR FISCAL YEAR ENDING JUNE 30, 1910.

At the beginning of the fiscal year all the preliminary work of preparing a suitable design had been completed. A contract for the work of erecting the monument was drawn up and signed and material was shipped to the site and put in place. The work of cutting and dressing the granite blocks was prosecuted diligently, but it took considerable time to complete this part of the work. The work, however, was well executed and the results highly satisfactory. The cost of erecting the monument was $9,200.

The monument was completed on June 2, 1910, the premises were cleared of all rubbish, etc., and the monument was dedicated June 14, 1910.

APPROPRIATION.

March 4, 1907 ..... $10,000

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MONUMENT TO COMMEMORATE THE TAKING POSSESSION OF THE PACIFIC COAST BY COMMODORE JOHN D. SLOAT, U. S. NAVY, AT MONTEREY, CAL.

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APPENDIX O O O.

LAWS

AFFECTING

THE CORPS OF ENGINEERS, UNITED STATES ARMY.

SIXTY-FIRST CONGRESS, SECOND SESSION, 1909–1910.

[No. 2.] Joint Resolution Authorizing a portion of the appropriation made for the improvement of Tennessee River to be applied to work at the Colbert and Bee Tree Shoals Canal.

January 7, 1910.
[H. J. Res. 83.]
[Pub. Res. No. 8.]

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That the sum of fifteen thousand dollars, or so much thereof as may be necessary, of the unexpended balance of appropriations heretofore made for the improvement of Tennessee River between Chattanooga, Tennessee, and Riverton, Alabama, may, in the discretion of the Secretary of War, be applied to work at the Colbert and Bee Tree Shoals Canal for the purpose of opening said canal to navigation.

Tennessee River.
Use of balance for Colbert and Bee Tree Shoals Canal.
Vol. 34, p. 1093.

Approved, January 7, 1910.

CHAP. 1.—An Act To amend an Act entitled "An Act to amend an Act to authorize the city of Saint Louis, a corporation organized under the laws of the State of Missouri, to construct a bridge across the Mississippi River," approved January ninth, nineteen hundred and nine.

January 7, 1910.
[H. R. 14565.]
[Public, No. 12.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the city of Saint Louis shall have authority to construct the bridge mentioned in the Act entitled "An Act to amend an Act to authorize the city of Saint Louis, a corporation organized under the laws of the State of Missouri, to construct a bridge across the Mississippi River," approved January ninth, nineteen hundred and nine, under and subject to the limitations and restrictions mentioned in the Act entitled "An Act to authorize the city of Saint Louis, a corporation organized under the

Mississippi River.
Time extended for bridging, by Saint Louis, Mo.
Vol. 35, p. 585.
Vol. 34, p. 461.

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laws of the State of Missouri, to construct a bridge across the Mississippi River," approved June twenty-fifth, nineteen hundred and six, if the actual construction of the bridge therein authorized shall be commenced within one year from the approval of this Act and completed within three years from same date.

Approved, January 7, 1910.

January 19, 1910. [H. J. Res. 120.]

[No. 4.] Joint Resolution To remove ice gorges in the Ohio River.

[Pub. Res. No. 10.]

Ohio River. Appropriation for removing ice gorges in.

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That to enable the Secretary of War to take such steps as he may deem to be necessary in the removal of ice gorges in the Ohio River, which are threatening the destruction of life and property, there is appropriated, out of any money in the Treasury not otherwise appropriated, the sum of ten thousand dollars, or so much thereof as may be necessary.

Approved, January 19, 1910.

January 26, 1910. [S. 3929.]

CHAP. 2.—An Act To authorize the Tennessee, Alabama and Kentucky Railway to construct a bridge across the Cumberland River at or near the town of Gainesboro, Tennessee.

[Public, No. 13.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Tennessee, Alabama and Kentucky Railway, a corporation organized under the laws of the State of Tennessee, is hereby authorized to construct, maintain, and operate a bridge and approaches thereto across the Cumberland River at a point suitable to the interests of navigation at or near the town of Gainesboro, in the State of Tennessee, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Cumberland River.

Tennessee, Alabama and Kentucky Railway may bridge, at Gainesboro, Tenn.

Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, January 26, 1910.

January 26, 1910. [S. 4016.]

CHAP. 3.—An Act To extend the time for the completion of a bridge across the Missouri River at or near Yankton, South Dakota, by the Winnipeg, Yankton and Gulf Railroad Company.

[Public, No. 14.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That section six of the Act approved April fifth, nineteen hundred and four, authorizing the Winnipeg,

Missouri River.

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Yankton and Gulf Railroad Company to construct a combined railroad, wagon, and foot-passenger bridge, across the Missouri River at or near the city of Yankton, South Dakota, as amended by the Act approved February twenty-seventh, nineteen hundred and nine, be, and the same is hereby, so amended that the time within which the said bridge is required to be commenced shall be within one year and the time within which it is required that the said bridge shall be completed shall be within three years from the date of the approval of this Act.

Time extended for bridging, at Yankton, S. Dak., by Winnipeg, Yankton and Gulf Railroad Company. Vol. 33, p. 157. Vol. 35, p. 658.

Approved, January 26, 1910.

CHAP. 6.—An Act To extend the time for Ashley County, Arkansas, to construct a bridge across Bayou Bartholomew, at a point near Morrell.

January 27, 1910. [H. R. 12140.] [Public, No. 17.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the time for commencing and completing the construction of a bridge, authorized by the Act approved February twentieth, nineteen hundred and eight, entitled "An Act to authorize the county of Ashley, State of Arkansas, to construct a bridge across Bayou Bartholomew, at a point above Morrell, in said county and State, the dividing line between Drew and Ashley counties," is hereby extended to one year and three years, respectively, from the date of approval of this Act.

Bayou Bartholomew. Time extended for bridging, by Ashley County, Ark., at Morrell. Vol. 35, p. 33.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, January 27, 1910.

CHAP. 7.—An Act To authorize the city of Minneapolis, in the State of Minnesota, to construct a bridge across the Mississippi River in said city.

January 27, 1910. [H. R. 12288.] [Public, No. 18.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the city of Minneapolis, in the County of Hennepin and State of Minnesota, a municipal corporation organized under the laws of the State of Minnesota, be, and it is hereby, authorized to construct, maintain, and operate a bridge and approaches thereto across the Mississippi River from Third avenue south, on the west side of said river, to First avenue southeast, on the east side of said river, in the city of Minneapolis, in the State of Minnesota, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Mississippi River. Minneapolis, Minn., may bridge. Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, January 27, 1910.

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January 27, 1910. [H. R. 13872.] [Public, No. 19.]

CHAP. 8.—An Act To authorize the counties of Bradley and McMinn, Tennessee, by authority of their county courts, to construct a bridge across the Hiwassee River at Charleston and Calhoun, in said counties.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the counties of Bradley and McMinn, Tennessee, by authority of their county courts, be, and they are hereby, authorized to construct, maintain, and operate a free bridge and approaches thereto, across the Hiwassee River, at a point suitable to the interests of navigation from the town of Charleston, in Bradley County, to the town of Calhoun, immediately across the Hiwassee River, in McMinn County, in the State of Tennessee, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Hiwassee River.

Bradley and McMinn counties, Tenn., may bridge, between Charleston and Calhoun.

Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, January 27, 1910.

January 27, 1910. [H. R. 14496.] [Public, No. 20.]

CHAP. 9.—An Act To authorize the city of Minneapolis, in the State of Minnesota, to construct a bridge across the Mississippi in said city.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the city of Minneapolis, in the county of Hennepin and State of Minnesota, a municipal corporation organized under the laws of the State of Minnesota, be, and it is hereby, authorized to construct, maintain, and operate a bridge and approaches thereto across the Mississippi River from Twentieth avenue south on the west side of said river to Eleventh avenue southeast on the east side of said river, in the city of Minneapolis, in the State of Minnesota, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Mississippi River.

Minneapolis, Minn., may bridge.

Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, January 27, 1910.

January 27, 1910. [H. R. 15815.] [Public, No. 21.]

CHAP. 10.—An Act Authorizing the construction of a railroad bridge across the Rio Grande River between Laredo, Texas, and Nuevo Laredo, Republic of Mexico.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That Los Ferrocarriles Nacionales de Mexico

Rio Grande.

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(National Railways of Mexico), a corporation organized under the laws of the Republic of Mexico, its successors and assigns, be, and it is hereby, authorized to construct a bridge and approaches thereto across the Rio Grande at a point suitable to the interests of navigation in Laredo, State of Texas, to a point in Neuvo Laredo, Republic of Mexico. Said bridge to be erected and constructed in accordance with the provisions of an Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six: *Provided*, That the construction of the said bridge shall not be commenced until the consent of the proper authorities of the Republic of Mexico for the erection of the structure shall have been obtained.

National Railways of Mexico may bridge, between Laredo, Tex., and Nuevo Laredo, Mexico.

Vol. 34, p. 84.

Proviso. Consent of Mexico.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, January 27, 1910.

CHAP. 11.—An Act To authorize the Monongahela Railroad Company to construct a bridge across the Monongahela River between Fayette and Greene counties, Pennsylvania.

January 27, 1910. [H. R. 16388.] [Public, No. 22.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Monongahela Railroad Company, a corporation organized and existing under the laws of the State of Pennsylvania, is hereby authorized to construct a bridge across the Monongahela River from a point, suitable to the interests of navigation, on the east bank thereof just south of New Geneva, in Fayette County, to the west bank of said river in Greene County near the mouth of Dunkard Creek in accordance with the provisions of the Act entitled "An Act to regulate construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Monongahela River. Monongahela Railroad Company may bridge, at New Geneva, Pa.

Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, January 27, 1910.

CHAP. 15.—An Act To authorize the construction of a bridge across the Red River and to establish it as a post-road.

January 28, 1910. [S. 4089.] [Public, No. 24.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That William Kenefick or his assigns be, and they are hereby, authorized to construct and maintain a lift or draw railway, foot-passenger, and wagon bridge and approaches thereto across the Red River at a point suitable to the interests of navigation on the southern line of Bryan County, State of Oklahoma, at or near what is

Red River. William Kenefick may bridge, in Bryan County, Okla.

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known as the Upper or Carpenters Bluff Crossing, in said county and State, in accordance with the provisions of an Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, January 28, 1910.

January 28, 1910.
[H. R. 5463.]
[Public, No. 25.]

CHAP. 16.—An Act To provide for a change in the bridge authorized by an Act entitled "An Act to authorize the building of a bridge at Dardanelle, Arkansas," approved September thirtieth, eighteen hundred and ninety.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the bridge authorized to be constructed by an Act entitled "An Act to authorize the building of a bridge at Dardanelle, Arkansas, across the Arkansas River," approved September thirtieth, eighteen hundred and ninety, shall hereafter provide a pontoon draw span of said bridge of such length as the Secretary of War may require in the interests of navigation, but not less than one hundred and fifty feet, and that the location thereof shall be changed from time to time by the owners of said bridge at their own expense, as may be directed by the Secretary of War, so that the same may conform to the changes in the channel of the river.

Arkansas River.
Draw required in bridge across, at Dardanelle, Ark.
Vol. 26, p. 560, amended.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, January 28, 1910.

January 28, 1910.
[H. R. 12138.]
[Public, No. 26.]

CHAP. 17.—An Act To extend the time for Ashley County, Arkansas, to construct a bridge across Bayou Bartholomew, at Portland.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the time for commencing and completing the bridge authorized by the Act approved April first, nineteen hundred and eight, entitled "An Act to authorize the county of Ashley, in the State of Arkansas, to construct a bridge across Bayou Bartholomew, Ashley County, Arkansas, at Portland," is hereby extended one year and three years, respectively, from the date of approval of this Act.

Bayou Bartholomew.
Time extended for bridging, by Ashley County, at Portland, Ark.
Vol. 35, p. 54.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, January 28, 1910.

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CHAP. 18.—An Act To extend the time for Ashley County, Arkansas, to construct a bridge across Bayou Bartholomew, at Wilmot.

January 28, 1910.
[H. R. 12139.]
[Public, No. 27.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the time for commencing and completing the bridge authorized by the Act approved April first, nineteen hundred and eight, entitled "An Act to authorize the county of Ashley, in the State of Arkansas, to construct a bridge across Bayou Bartholomew, Ashley County, Arkansas, at Wilmot," is hereby extended one year and three years, respectively, from the date of approval of this Act.

Bayou Bartholomew. Time extended for bridging, by Ashley County, at Wilmot, Ark. Vol. 35, p. 54.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, January 28, 1910.

CHAP. 19.—An Act Authorizing the town of Bass Brook to construct a bridge across the Mississippi River, in Itasca County, Minnesota.

January 28, 1910.
[H. R. 15387.]
[Public, No. 28.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress is hereby granted to the town of Bass Brook, a municipal corporation organized and existing under and pursuant to the laws of the State of Minnesota, to build a public highway bridge across the Mississippi River at a point suitable to the interests of navigation from a point on the northerly bank of said river, in lot one, section ten, township fifty-five north, range twenty-six west, fourth principal meridian, to a point on the southerly bank of said river, in lot twelve of said section, all in the county of Itasca, State of Minnesota, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Mississippi River. Bass Brook, Minn., may bridge. Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, January 28, 1910.

CHAP. 22.—An Act To legalize a bridge across the Snake River, between the States of Idaho and Oregon.

February 3, 1910.
[S. 3318.]
[Public, No. 30.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress is hereby granted to the county court of Malheur County, in the State of Oregon, and the Ontario bridge commission to maintain and operate a bridge and approaches thereto now con-

Snake River. Bridge across, at Ontario, Oreg., legalized.

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structed across the Snake River at the town of Ontario, Oregon, in accordance with the provisions of an Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six: *Provided*, That the said county court of Malheur County and the said Ontario bridge commission shall, within three months after the passage of this Act, file with the Secretary of War their acceptance of this Act, together with plans and specifications of the said bridge, and said plans and specifications shall have been approved by the Secretary of War and the Chief of Engineers; otherwise, this Act shall be null and void.

Vol. 34, p. 84.

Proviso. Approval, etc.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, February 3, 1910.

February 3, 1910. [S. 4891.] [Public, No. 31.]

CHAP. 23.—An Act To extend the time for the commencement and completion of a railroad bridge across the Kansas River at or near Kansas City, Kansas, in the county of Wyandotte, State of Kansas.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the time for commencing and completing the bridge authorized by the Act entitled "An Act to authorize the Edgewater Connecting Railway Company to construct, maintain, and operate a railroad bridge across the Kansas River at or near Kansas City, Kansas, in the county of Wyandotte, State of Kansas," approved February sixth, nineteen hundred and nine, is hereby extended one and three years, respectively, from the date of approval of this Act.

Kansas River. Time extended for bridging, by Edgewater Connecting Railway Company, Kansas City, Kans. Vol. 35, p. 612.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, February 3, 1910.

February 3, 1910. [S. 5040.] [Public, No. 32.]

CHAP. 24.—An Act To authorize Bonners Ferry Bridge Commission to construct a bridge across the Kootenai River at Bonners Ferry, Idaho.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Bonners Ferry Bridge Commission, created by the legislature of Idaho under the provisions of an act approved March seventeenth, nineteen hundred and nine, its successors and assigns, be, and they are hereby, authorized to construct, maintain, and operate a free bridge and approaches thereto across the Kootenai River at a point suitable to the interests of navigation at Bonners Ferry, in the State of Idaho, in accordance with the provisions

Kootenai River, Idaho. Bonners Ferry Bridge Commission may bridge.

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of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six. Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved. Amendment.

Approved, February 3, 1910.

CHAP. 29.—An Act To legalize the construction of a bridge across the Mississippi River at Hill City, Aitkin County, Minnesota. February 15, 1910. [H. R. 11307.] [Public, No. 36.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress is hereby granted to the Mississippi, Hill City and Western Railway Company, a corporation of the State of South Dakota, to maintain and operate the bridge and approaches thereto now constructed across the Mississippi River at section four, township fifty-two north, range twenty-three west, in Aitkin County, in the State of Minnesota, in accordance with the provisions of an Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six: *Provided*, That the said Mississippi, Hill City and Western Railway Company shall, within three months after the passage of this Act, file with the Secretary of War their acceptance of this Act, together with plans and specifications of the said bridge, and said plans and specifications shall have been approved by the Secretary of War and the Chief of Engineers; otherwise, this Act shall be null and void. Mississippi River. Mississippi, Hill City and Western Railway Company's bridge at Hill City, Minn., legalized. Vol. 34, p. 84. *Proviso.* Secretary of War to approve plans, etc.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved. Amendment.

Approved, February 15, 1910.

CHAP. 30.—An Act To authorize the city of Minneapolis, in the State of Minnesota, to construct a bridge across the Mississippi River in said city. February 15, 1910. [H. R. 12289.] [Public, No. 37.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the city of Minneapolis, in the county of Hennepin and State of Minnesota, a municipal corporation organized under the laws of the State of Minnesota, be, and it is hereby, authorized to construct, maintain, and operate a new bridge and approaches thereto across the Mississippi River, where an old bridge is now standing, from Plymouth avenue north, on the west side of said river, to Eighth avenue northeast, on the east side of said river, in the city of Minneapolis, in the State of Minnesota, in accordance with the provisions of the Act en- Mississippi River. Minneapolis, Minn., may bridge, Plymouth avenue to Eighth avenue.

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Vol. 34, p. 84. titled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Amendment. SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, February 15, 1910.

February 15, 1910. [H. R. 13438.]

CHAP. 31.—An Act To declare One Hundred and Two River in Missouri nonnavigable.

[Public, No. 38.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That One Hundred and Two River south of the north boundary line of Andrew County, Missouri, as now located, be, and the same is hereby, declared to be not a navigable water of the United States within the meaning of the laws enacted by Congress for the preservation and protection of such waters.

One Hundred and Two River, Mo.

Declared not a navigable water.

Amendment. SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, February 15, 1910.

February 15, 1910. [H. R. 13439.]

CHAP. 32.—An Act To declare Nodaway River in Missouri nonnavigable.

[Public, No. 39.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That Nodaway River, in the counties of Andrew, Holt, and Nodaway, in the State of Missouri, be, and the same is hereby, declared to be not a navigable water of the United States within the meaning of the laws enacted by Congress for the preservation and protection of such waters.

Nodaway River, Mo.

Declared not a navigable water.

Amendment. SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, February 15, 1910.

February 15, 1910. [H. R. 13440.]

CHAP. 33.—An Act To declare Big Tarkio River, in Holt and Atchison counties, Missouri, nonnavigable.

[Public, No. 40.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That Big Tarkio River, in the counties of Holt and Atchison, in the State of Missouri, be, and the same is hereby, declared to be not a navigable water of the United States within the meaning of the laws enacted by Congress for the preservation and protection of such waters.

Big Tarkio River, Mo.

Declared not a navigable water.

Amendment. SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, February 15, 1910.

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CHAP. 35.—An Act To authorize the Union Railroad and Dock Company to construct and operate a bridge across the Monongahela River in the State of West Virginia.

February 15, 1910.
[H. R. 17161.]
[Public, No. 42.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Union Railroad and Dock Company, a corporation organized under the laws of the State of West Virginia, is hereby authorized to construct, maintain, and operate a bridge and approaches thereto across the Monongahela River at Morgantown, from a point suitable to the interests of navigation on the right shore of said river near the end of Fayette street, in Morgantown, to a point on the left shore of said river, in Grant District, all in the county of Monongalia and State of West Virginia, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Monongahela River.
Union Railroad and Dock Company may bridge, at Morgantown, W. Va.
Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, February 15, 1910.

CHAP. 36.—An Act To authorize Clay County, Arkansas, to construct a bridge across Current River.

February 15, 1910.
[H. R. 17743.]
[Public, No. 43.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the county of Clay, in the State of Arkansas, a corporation organized under the laws of the State of Arkansas, is hereby authorized to construct, maintain, and operate a bridge and approaches thereto across the Current River at a point suitable to the interests of navigation at or near the point where the section line between sections seventeen and twenty, township twenty-one north, range three east, crosses said river in the State of Arkansas, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Current River.
Clay County, Ark., may bridge.
Location.
Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, February 15, 1910.

CHAP. 38.—An Act To authorize the Wilson and Glassport Bridge Company to construct a bridge across the Monongahela River between Wilson and Glassport boroughs, Allegheny County, Pennsylvania.

February 16, 1910.
[H. R. 18895.]
[Public, No. 44.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Wilson and Glassport Bridge Company, a

Monongahela River.

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Wilson and Glassport Bridge Company may bridge between Wilson and Glassport, Pa.

corporation organized and existing under the laws of the State of Pennsylvania, is hereby authorized to construct a bridge across the Monongahela River from a point suitable to the interests of navigation, in the borough of Wilson, Allegheny County, Pennsylvania, to a point on the opposite side of said river in the borough of Glassport, said county and State, in accordance with the provisions of the Act entitled "An Act to regulate construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, February 16, 1910.

February 16, 1910. [H. R. 19399.]

[Public, No. 45.]

CHAP. 39.—An Act To extend the time for the completion of bridge across the Mississippi River at Saint Louis, Missouri, by the Saint Louis Electric Bridge Company.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the time for completing the construction of the bridge authorized by the Act entitled "An Act providing for the construction of a bridge across the Mississippi River," approved February fifteenth, nineteen hundred and seven, is hereby extended to one year from the date of the passage of this Act.

Mississippi River.

Time extended for bridging, by Saint Louis Electric Bridge Company.

Vol. 34, p. 892.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, February 16, 1910.

February 19, 1910. [H. R. 15448.]

[Public, No. 47.]

CHAP. 41.—An Act To authorize certain changes in the permanent system of highways plan, District of Columbia.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Commissioners of the District of Columbia are hereby authorized to prepare a new highway plan for that portion of the third section of the permanent system of highways plan lying west of Rock Creek, north of Massachusetts avenue and the Observatory Circle, east of Thirty-sixth street west, south of Cathedral avenue, southwest of Cleveland avenue, south of Calvert street, and southwest of Connecticut avenue, under the provision contained in the Act of Congress approved March second, eighteen hundred and ninety-three, entitled "An Act to provide a permanent system of highways in that part of the District of Columbia lying outside of cities," and the amendment to said Act approved June twenty-eighth,

District of Columbia.

New highway plan for northwest section.

Vol. 27, p. 532.

Vol. 30, p. 520.

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eighteen hundred and ninety-eight, which reads as follows:

"The plat of such readjustment, after being duly certified by said commissioners, shall be forwarded to the commission, consisting of the Secretary of War, the Secretary of the Interior, and the Chief of Engineers of the United States Army, and when approved by said commission or a majority thereof the change shall be recorded in the office of the surveyor of the District of Columbia, and become a part of the permanent system of highways, and take the place of any part inconsistent therewith." Record, etc., of change.

Approved, February 19, 1910.

CHAP. 42.—An Act To authorize the Thacker Coal Mining Company to construct a footbridge across Tug River, at Thacker, Mingo County, West Virginia. February 19, 1910. [H. R. 18411.] [Public, No. 48.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Thacker Coal Mining Company, a corporation organized under the laws of the State of West Virginia, is hereby authorized to construct, maintain, and operate a footbridge and approaches thereto, across the Tug River at a point suitable to the interests of navigation, at or near Thacker, in the county of Mingo, in the State of West Virginia, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six. Tug River, W. Va. Thacker Coal Mining Company may bridge, at Thacker. Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved. Amendment.

Approved, February 19, 1910.

CHAP. 43.—An Act To amend an Act authorizing the construction of a bridge across the Missouri River at Kansas City, Missouri. February 19, 1910. [H. R. 18592.] [Public, No. 49.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Act approved February twentieth, nineteen hundred and seven, entitled "An Act to amend an Act entitled 'An Act to amend an Act to construct a bridge across the Missouri River at a point between Kansas City and Sibley, in Jackson County, Missouri,' approved March nineteenth, nineteen hundred and four," be, and the same is hereby, amended so as to read as follows: Missouri River. Time extended for bridging between Kansas City and Sibley, Mo. Vol. 34, p. 911, amended.

"That the construction of the bridge authorized to be constructed by the Act approved March third, eighteen hundred and eighty-seven, and of which this Act is amendatory, shall be completed within two years from Time of construction. Vol. 24, p. 493. Vol. 28, p. 45. Vol. 33, p. 142.

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March nineteenth, nineteen hundred and ten, and the time for so doing is hereby extended accordingly, and unless these conditions are complied with, this Act and the Acts of which it is amendatory shall be null and void:

Proviso. Operation, etc.

Provided, That in all matters and particulars not expressly provided for in the Acts of which this Act is amendatory, the construction, maintenance, and operation of such bridge shall be in accordance with the provisions of the Act of Congress approved March twenty-third, nineteen hundred and six, entitled 'An Act to regulate the construction of bridges over navigable waters.'

Vol. 34, p. 84.

Amendment.

"SEC. 2. That the right to alter, amend, or repeal this Act and the Acts of which it is amendatory is hereby expressly reserved."

Approved, February 19, 1910.

February 19, 1910. [H. R. 18695.] [Public, No. 50.]

CHAP. 44.—An Act To revive an Act to authorize the construction of a bridge across Tug Fork of Big Sandy River, West Virginia.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Act entitled "An Act authorizing the Borderland Coal Company to construct a bridge across Tug Branch of Big Sandy River," approved June twenty-ninth, nineteen hundred and six, is hereby revived and re-enacted: *Provided*, That actual construction of the bridge therein authorized shall be commenced within one year and completed within three years from the date of the passage of this Act.

Tug Fork Big Sandy River.

Time extended for bridging, at Nolan, W. Va.

Vol. 34, p. 626.

Proviso. Time of construction.

Amendment.

SEC. 2. The right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, February 19, 1910.

February 19, 1910. [H. R. 18806.] [Public, No. 51.]

CHAP. 45.—An Act To authorize the construction, maintenance, and operation of a bridge across the Black River near Paroquet, Arkansas.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Saint Louis, Iron Mountain and Southern Railway Company, a corporation organized and existing under the laws of the States of Missouri and Arkansas, is hereby authorized to construct, maintain, and operate a railroad bridge and approaches thereto across the Black River at a point suitable to the interests of navigation near Paroquet, Arkansas, or to reconstruct, maintain, and operate the present bridge of said company across the said river in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges

Black River, Ark.

Saint Louis, Iron Mountain and Southern Railway Company may bridge, at Paroquet.

Vol. 34, p. 84.

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over navigable waters," approved March twenty-third, nineteen hundred and six.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved. Amendment.

Approved, February 19, 1910.

CHAP. 46.—An Act To authorize the construction, maintenance, and operation of a bridge across the Saint Francis River near Parkin, Arkansas. February 19, 1910. [H. R. 18807.] [Public, No. 52.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Saint Louis, Iron Mountain and Southern Railway Company, a corporation organized and existing under the laws of the States of Missouri and Arkansas, is hereby authorized to construct, maintain, and operate a railroad bridge and approaches thereto across the Saint Francis River at a point suitable to the interests of navigation near Parkin, Arkansas, or to reconstruct, maintain, and operate the present bridge of said company across the said river in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six. Saint Francis River, Ark. Saint Louis, Iron Mountain and Southern Railway Company may bridge, at Parkin. Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved. Amendment.

Approved, February 19, 1910.

CHAP. 47.—An Act To authorize the construction, maintenance, and operation of a bridge across the White River, at Augusta, Arkansas. February 19, 1910. [H. R. 18808.] [Public, No. 58.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Saint Louis, Iron Mountain and Southern Railway Company, a corporation organized and existing under the laws of the States of Missouri and Arkansas, is hereby authorized to construct, maintain, and operate a railroad bridge and approaches thereto across the White River, at a point suitable to the interests of navigation, at Augusta, Arkansas, or to reconstruct, maintain, and operate the present bridge of said company across the said river in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six. White River, Ark. Saint Louis, Iron Mountain and Southern Railway Company may bridge, at Augusta. Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved. Amendment.

Approved, February 19, 1910.

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February 21, 1910.
[H. R. 11989.]
[Public, No. 54.]

CHAP. 50.—An Act To provide for the removal of present grade crossing, and construction of a new grade crossing on the line of Q street northeast, District of Columbia.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That within thirty days after the passage of this Act the Baltimore and Ohio Railroad Company and the Philadelphia, Baltimore and Washington Railroad Company be, and they are hereby, directed and required to remove the present grade crossing over their tracks between P and Q streets northeast, in the District of Columbia, and to construct a grade crossing over said tracks on the line of Q street northeast; all work within the limits of the rights of way of said railroad companies to be done by them at their own cost and expense and all necessary work outside of said rights of way to be done by the District of Columbia.

District of Columbia.
Change of grade crossing, Q street northeast.
Payment of expense.

Approved, February 21, 1910.

February 21, 1910.
[H. R. 16324.]
[Public, No. 55.]

CHAP. 51.—An Act To authorize the extension of Park place northwest.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That, under and in accordance with the provisions of subchapter one of chapter fifteen of the Code of Law for the District of Columbia, within ninety days after the passage of this Act, the Commissioners of the District of Columbia be, and they are hereby, authorized and directed to institute in the supreme court of the District of Columbia a proceeding in rem to condemn the land that may be necessary for the extension of Park place along the west line of the Soldiers' Home lands, with a width of forty feet: *Provided*, *however*, That the entire amount found to be due and awarded by the jury in said proceeding as damages for, and in respect of, the land to be condemned for said extension, including the costs and expenses of the proceeding hereunder, shall be assessed by the jury as benefits.

District of Columbia.
Park place northwest.
Condemning land for extending.
Vol. 34, p. 151.
Proviso.
Damages, etc., assessed as benefits.

SEC. 2. That there is hereby appropriated, out of the revenues of the District of Columbia, an amount sufficient to pay the necessary costs and expenses of the condemnation proceedings taken pursuant hereto and for the payment of amounts awarded as damages, to be repaid to the District of Columbia from the assessments for benefits and covered into the Treasury to the credit of the revenues of the District of Columbia.

Appropriation for expenses, etc.
Payment of awards.

Approved, February 21, 1910.

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CHAP. 52.—An Act For the extension of Franklin street northeast from its present eastern terminus east of Twenty-fourth street to the Bladensburg road.

February 21, 1910.
[H. R. 16828.]
[Public, No. 56.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That under and in accordance with the provisions of subchapter one of chapter fifteen of the Code of Law for the District of Columbia, within ninety days after the passage of this Act, the Commissioners of the District of Columbia be, and they are hereby, authorized and directed to institute a proceeding in rem to condemn the land that may be necessary for the opening of Franklin street northeast from its present eastern terminus east of Twenty-fourth street to the Bladensburg road, according to the permanent system of highway plans in and for the District of Columbia: *Provided, however*, That the entire amount found to be due and awarded by the jury in said proceeding as damages for and in respect of the land to be condemned for said extension shall be assessed by the jury as benefits: *And provided further*, That nothing in said subchapter one of chapter fifteen of said code shall be construed to authorize the jury to assess less than the aggregate amount of the damages awarded for and in respect of the land to be condemned and the costs and expenses of the proceeding hereunder.

District of Columbia.
Franklin street northeast.
Condemning land for extending.
Vol. 34, p. 151.
Provisos.
Damages assessed as benefits.
Minimum assessment.

SEC. 2. That there is hereby appropriated, out of the revenues of the District of Columbia, an amount sufficient to pay the necessary costs and expenses of the condemnation proceedings taken pursuant hereto and for the payment of amounts awarded as damages, to be repaid to the District of Columbia from the assessments for benefits and covered into the Treasury to the credit of the revenues of the District of Columbia.

Appropriation for expenses, etc.
Payment of awards.

Approved, February 21, 1910.

CHAP. 53.—An Act To provide for the extension of Newton place northwest from New Hampshire avenue to Georgia avenue, and to connect Newton place in Gass subdivision with Newton place in Whitney Close subdivision.

February 21, 1910.
[H. R. 16329.]
[Public, No. 57.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That under and in accordance with the provisions of subchapter one of chapter fifteen of the Code of Law for the District of Columbia, within ninety days from the passage of this Act, the Commissioners of the District of Columbia be, and are hereby, authorized and directed to institute in the supreme court of the District of Columbia a proceeding in rem to condemn the land that may be necessary to extend Newton place northwest from its present terminus near New Hampshire avenue to Georgia avenue, with a width of fifty feet, and to connect Newton

District of Columbia.
Newton place northwest.
Condemning land for extending.
Vol. 34, p. 151.

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place east of Georgia avenue in Gass subdivision with Newton place in Whitney Close subdivision, upon such lines as the Commissioners of the District of Columbia may deem best for the public interest: *Provided, however,* That the entire amount found to be due and awarded by the jury in said proceeding as damages for and in respect of the land to be condemned for said extension, plus the costs and expenses of said proceeding, shall be assessed by the jury as benefits.

Proviso. Damages, etc., assessed as benefits.

Appropriation for expenses, etc.

Payment of awards.

SEC. 2. That there is hereby appropriated, out of the revenues of the District of Columbia, an amount sufficient to pay the necessary costs and expenses of the condemnation proceedings taken pursuant hereto and for the payment of amounts awarded as damages, to be repaid to the District of Columbia from the assessments for benefits and covered into the Treasury to the credit of the revenues of the District of Columbia.

Approved, February 21, 1910.

February 21, 1910. [H. R. 16336.]

[Public, No. 58.]

CHAP. 54.—An Act Authorizing certain changes in the plan for the permanent system of highways for that portion of the District of Columbia lying west of Rock Creek Park, north of Klingle road, east of Connecticut avenue, and south of Ellicott street northwest.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Commissioners of the District of Columbia be, and they are hereby, authorized to prepare a new highway plan for that portion of the District of Columbia lying west of Rock Creek Park, north of Klingle road, east of Connecticut avenue, and south of Ellicott street northwest, under the provisions contained in the Act of Congress approved March second, eighteen hundred and ninety-three, entitled "An Act to provide a permanent system of highways in that part of the District of Columbia lying outside of cities," and an amendment to said Act approved June twenty-eighth, eighteen hundred and ninety-eight; that upon the completion and recording of said new highway plan it shall take the place of and stand for any previous plan for said portion of the District of Columbia.

District of Columbia. New highway plan for northwest section.

Vol. 27, p. 532.

Vol. 30, p. 519.

Record, etc., of change.

Approved, February 21, 1910.

February 24, 1910. [H. J. Res. 101.]

[Pub. Res., No. 18.]

[No. 12.] Joint Resolution Authorizing an extension of the tracks of the Atchison, Topeka and Santa Fe Railway on the military reservation at Fort Leavenworth, Kansas.

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of War be, and he is hereby, authorized to permit the Atchison, Topeka and Santa Fe Railway Company to extend its tracks on the military reservation at Fort Leavenworth, Kansas, in such manner as he may deem expedient, for the purpose of con-

Fort Leavenworth, Kans. Atchison, Topeka and Santa Fe Railway Company granted right of way on reservation.

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necting said tracks with the government terminal switch tracks on that reservation: *Provided*, That such extension shall be made without expense to the United States. *Proviso.* No expense.

Approved, February 24, 1910.

CHAP. 62.—An Act Making appropriations to supply urgent deficiencies in appropriations for the fiscal year nineteen hundred and ten, and for other purposes. February 25, 1910. [H. R. 18282.] [Public, No. 62.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums be, and are hereby, appropriated, out of any money in the Treasury not otherwise appropriated, to supply urgent deficiencies in appropriations for the fiscal year nineteen hundred and ten, and for other purposes, namely: Urgent deficiencies appropriations.

* * * * *

WAR DEPARTMENT.

War Department.

PUBLIC BUILDINGS AND GROUNDS IN AND AROUND WASHINGTON.

Public buildings and grounds, D. C.

Monument to General Count Pulaski: For completing and unveiling the statue of General Count Pulaski, including cost of inspecting models, preparing site, superintending construction, and so forth, as follows: Granite coping around the monument, six hundred and forty dollars; asphalt walks, six hundred dollars; grading, soiling, and sodding, seven hundred and sixty dollars; unveiling monument, two thousand five hundred dollars; inspection, superintendence, final payment to sculptor, and so forth, five hundred dollars; in all, five thousand dollars. General Pulaski. Completing, etc., monument to.

Unveiling statue of General Thaddeus Kosciuszko: For preparing site selected for the statue of General Thaddeus Kosciuszko, and for unveiling the statue, including all necessary expenses of inspection and superintendence, as follows: Granite coping around the monument, seven hundred dollars; granite coping and posts for park coping, three hundred dollars; asphalt walks, three hundred dollars; grading, soiling, and sodding, seven hundred dollars; unveiling monument, inspection, and so forth, one thousand five hundred dollars; in all, three thousand five hundred dollars. General Kosciuszko. Unveiling, etc., statue to.

* * * * *

CLAIMS ALLOWED BY THE AUDITOR FOR THE WAR DEPARTMENT.

* * * * *

For expenses California Débris Commission, six dollars and ten cents.

* * * * *

SEC. 4. That all laws and parts of laws inconsistent with this Act are repealed. Inconsistent laws repealed.

Approved, February 25, 1910.

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February 26, 1910. [S. 5680.]

[Public, No. 64.]

CHAP. 64.—An Act Authorizing the construction of a bridge across the Connecticut River, in the State of Connecticut, between the towns of Old Saybrook and Old Lyme.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the State of Connecticut, acting through the Saybrook and Lyme Connecticut River Bridge Commission, a commission created by the laws of the State of Connecticut, be, and hereby is, authorized to construct and maintain a drawbridge across the Connecticut River, at a point suitable to the interests of navigation, between the towns of Old Saybrook and Old Lyme, in the State of Connecticut, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Connecticut River.
Saybrook and Lyme Connecticut Bridge Commission may bridge, between Old Saybrook and Old Lyme, Conn.
Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, February 26, 1910.

February 26, 1910. [S. 6191.]

[Public, No. 65.]

CHAP. 65.—An Act To authorize the Fort Smith and Van Buren district to construct a bridge across the Arkansas River at Van Buren, in the State of Arkansas.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Fort Smith and Van Buren district, a body politic and corporate created by act of the general assembly of Arkansas approved April tenth, nineteen hundred and nine, to construct, maintain, and operate a bridge across the Arkansas River at Van Buren, Arkansas, and its successors and assigns, be, and is hereby, authorized to construct, maintain, and operate a bridge and approaches thereto across the Arkansas River between the cities of Fort Smith and Van Buren, at a point suitable to the interests of navigation, one end of said bridge to be in the corporate limits of the city of Van Buren, in accordance with the provisions of the Act of Congress entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Arkansas River.
Fort Smith and Van Buren district may bridge, at Van Buren, Ark.
Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, February 26, 1910.

February 26, 1910. [H. R. 17531.]

[Public, No. 66.]

CHAP. 66.—An Act To amend an Act authorizing the Washington, Spa Springs and Gretta Railroad Company, of Maryland, to enter the District of Columbia, with amendments, approved February eighteenth, nineteen hundred and seven.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That section eighteen of an Act authorizing the

District of Columbia.

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Washington, Spa Springs and Gretta Railroad Company, of Maryland, a corporation created by the laws of the State of Maryland and authorized by an Act of Congress approved February eighteenth, nineteen hundred and seven, to extend its line into the District of Columbia, as amended by an Act approved March third, nineteen hundred and nine, be, and the same is hereby, amended to read as follows:

Time extended for constructing Washington, Spa Springs and Gretta Railroad. Vol. 34, p. 896. Vol. 35, p. 779, amended.

"SEC. 18. That the construction of the said extension of the lines of said railroad company within the District of Columbia shall be completed within six months from the passage of this Act and cars in operation within the said period, in default of which this Act shall be void and of no effect: *And provided further*, That all the rights, duties, obligations, and requirements as to permits and deposits contained in the Act of February eighteenth, nineteen hundred and seven, authorizing the Washington, Spa Springs and Gretta Railroad Company to enter the District of Columbia, and all obligations imposed on said company by the Act amending the same, approved March third, nineteen hundred and nine, shall, in conjunction with this amendment, remain in full force and effect."

Time of construction.

Proviso. Permits and deposits.

Approved, February 26, 1910.

CHAP. 69.—An Act To authorize the Oregon Trunk Railway of the State of Washington to construct a bridge across the Columbia River and Celilo Canal.

March 2, 1910. [H. R. 17160.] [Public, No. 69.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Oregon Trunk Railway, a corporation organized under the laws of the State of Washington, is hereby authorized to construct, maintain, and operate a bridge and approaches thereto across the Columbia River, and the Celilo Canal, at a point suitable to the interests of navigation, at or near Celilo, in the States of Washington and Oregon, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six: *Provided*, That in approving the plans for the bridge herein authorized, the Secretary of War may, subject to such terms and conditions as in his judgment are equitable, expedient, and just to the public, grant to the said Oregon Trunk Railway a right of way across the lands of the United States on either side of, and adjacent to, the said Celilo Canal, and also the privilege of occupying so much of said lands as may be necessary for the piers, abutments, and other portions of the bridge structure and approaches.

Columbia River and Celilo Canal. Oregon Trunk Railway may bridge, at Celilo.

Vol. 34, p. 84.

Proviso. Right of way across Celilo Canal lands.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, March 2, 1910.

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March 2, 1910. [H. R. 19967.] [Public, No. 70.]

CHAP. 70.—An Act To authorize Thomas J. Ewing, George B. Patton, Otto Burger, William Cecil, and Milton E. Foster to construct a bridge across the Tug Fork of the Big Sandy River.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That Thomas J. Ewing, of Catlettsburg, Kentucky; George B. Patton, of Catlettsburg, Kentucky; Otto Burger, of Cincinnati, Ohio; William Cecil, of Catlettsburg, Kentucky; and Milton E. Foster, of Dayton, Ohio, their heirs and assigns, are hereby authorized to construct, maintain, and operate a wagon, foot, and railroad bridge and approaches thereto, across the Tug Fork of the Big Sandy River at a point suitable to the interests of navigation, at or on the property of The Warfield Coal and Salt Company, at Warfield, Kentucky, where the said Tug River forms the boundary line between the States of West Virginia and Kentucky, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Tug Fork, Big Sandy River.

Thomas J. Ewing et al. may bridge at Warfield, Ky.

Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, March 2, 1910.

March 2, 1910. [H. R. 15676.] [Public, No. 72.]

CHAP. 72.—An Act To provide for the extension of the underground system of the City and Suburban Railway Company on North Capitol street, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the City and Suburban Railway, of Washington, be, and it is hereby, authorized and directed to equip with the underground system of electric propulsion, as now installed on its urban lines, that part of its suburban route on North Capitol street between the present terminus of its underground system thereon near T street and a point to be approved by the Commissioners of the District of Columbia north of and within three hundred feet of the north building line of V street; said work to be completed within six months after the passage of this Act, in accordance with plans to be approved by the Commissioners of the District of Columbia.

District of Columbia.

City and Suburban Railway to extend underground system.

Completion.

Penalty for failure.

SEC. 2. That upon failure of said railway company to comply with the provisions of this Act it shall be subject to a penalty of not more than one hundred dollars per day, on prosecution by information filed in the police court of the District of Columbia by the corporation counsel or any of his assistants; and each day of such failure shall be regarded as a separate offense.

Approved, March 2, 1910.

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CHAP. 73.—An Act To acquire land in the vicinity of the Connecticut Avenue Bridge for the extension of certain streets.

March 2, 1910.
[H. R. 16331.]

[Public, No. 73.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That under and in accordance with the provisions of subchapter one of chapter fifteen of the Code of Law for the District of Columbia, within six months after the passage of this Act the Commissioners of the District of Columbia be, and they are hereby, authorized and directed to institute a proceeding in rem to condemn the land that may be necessary for the extension of Belmont road to Calvert street, and to connect said extension of Belmont road with Waterside drive, and to extend Waterside drive to the southerly line of the Zoological Park, as shown on plans on file in the office of the Engineer Commissioner.

District of Columbia. Belmont road, and Waterside drive northwest. Condemning land for extending. Vol. 34, p. 151.

That there is hereby appropriated, one-half from the revenues of the District of Columbia and one-half from any moneys in the Treasury not otherwise appropriated, an amount sufficient to pay the necessary costs and expenses of the condemnation proceedings taken pursuant hereto and for the payment of amounts awarded as damages, the amounts assessed for benefits to be paid to the District of Columbia and covered into the Treasury to the credit of the revenues of the District of Columbia and the United States in equal parts.

Appropriation for expenses, etc.

Payment of awards.

Approved, March 2, 1910.

CHAP. 74.—An Act To authorize the extension of Twenty-third and R streets southeast, in the District of Columbia.

March 2, 1910.
[H. R. 17514.]

[Public, No. 74.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That within six months after the passage of this Act the Commissioners of the District of Columbia be, and they are hereby, authorized and directed to institute in the supreme court of the District of Columbia, under and in accordance with the provisions of subchapter one of chapter fifteen of the Code of Law for the District of Columbia, a proceeding in rem to condemn the land that may be necessary for the extension of R street southeast from its present eastern terminus near Twenty-third street to Naylor street, and Twenty-third street southeast from its present southern terminus near Naylor street to R street, each with a uniform width of ninety feet: *Provided*, That the total amount found to be due and awarded as damages, plus the cost and expenses of the proceedings, shall be assessed by the said jury as benefits.

District of Columbia. Twenty-third, and R streets southeast. Condemning land for extending. Vol. 34, p. 151.

Proviso. Damages assessed as benefits.

SEC. 2. That there is hereby appropriated from the revenues of the District of Columbia an amount sufficient to pay the necessary costs and expenses of the condemnation

Appropriation for expenses, etc.

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Payment of awards.

proceedings taken pursuant hereto, and for the payment of amounts awarded as damages, to be repaid to the District of Columbia from the assessments for benefits and covered into the Treasury to the credit of the revenues of the District of Columbia.

Approved, March 2, 1910.

March 5, 1910. [S. 6051.] [Public, No. 76.]

CHAP. 81.—An Act To authorize the Louisville and Nashville Railroad Company to reconstruct, maintain, and operate its railway bridges across the Escambia Bay, Choctawhatchee River, and Apalachicola River, in the State of Florida.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Louisville and Nashville Railroad Company is hereby authorized to reconstruct, operate, and maintain its bridges on the line of railroad between Pensacola and River Junction in the State of Florida, to wit: First, its existing bridge over Escambia Bay; second, its existing bridge over Choctawhatchee River; third, its existing bridge over the Apalachicola River; all in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Escambia Bay, Choctawhatchee and Apalachicola rivers, Florida.
Louisville and Nashville Railroad Company may bridge.
Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, March 5, 1910.

March 8, 1910. [H. R. 13410.] [Public, No. 80.]

CHAP. 88.—An Act To modify the one hundred and twenty-second and one hundred and twenty-fourth articles of war, and to repeal the one hundred and twenty-third article of war.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the one hundred and twenty-second and one hundred and twenty-fourth articles of war be, and hereby are, modified to read as follows:

Army.
Articles of war.
R. S. sec. 1342, p. 241, amended.

Command, when different corps happen to join.

"ART. 122. If, upon marches, guards, or in quarters, different corps of the army happen to join or do duty together, the officer highest in rank of the line of the Army, Marine Corps, organized militia, or volunteers, by commission, there on duty or in quarters, shall command the whole, and give orders for what is needful in the service, unless otherwise specially directed by the President, according to the nature of the case."

Position of organized militia.

* * * * *

Rank of organized militia officers on duty with other forces.

"ART. 124. Officers of the organized militia of the several States, when called into the service of the United States, shall on all detachments, courts-martial, and other

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duty, wherein they may be employed in conjunction with the regular or volunteer forces of the United States, take rank next after all officers of the like grade in said regular forces, and shall take precedence of all officers of volunteers of equal or inferior rank, notwithstanding the commissions of such militia officers may be older than the commissions of the said officers of the regular forces of the United States."

Limited service rank, etc., repealed.

SEC. 2. That the one hundred and twenty-third article of war be, and hereby is, repealed.

Approved, March 8, 1910.

CHAP. 89.—An Act Permitting the Wisconsin Central Railway Company to construct, maintain, and operate a railroad bridge across the Saint Croix River between the States of Wisconsin and Minnesota.

March 12, 1910.
[S. 6449.]
[Public, No. 81.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress is hereby granted to the Wisconsin Central Railway Company, a railway corporation organized under the laws of the State of Wisconsin, to construct, maintain, and operate a railroad bridge and approaches thereto, across the Saint Croix River, at a point suitable to the interests of navigation, from a point on the east bank of said river in the vicinity of the township line between townships thirty and thirty-one north, in Saint Croix County, Wisconsin, to a point on the west bank of said river in the vicinity of the township line between said townships thirty and thirty-one north, in Washington County, Minnesota, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Saint Croix River.
Wisconsin Central Railway Company may bridge.
Location.
Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, March 12, 1910.

CHAP. 98.—An Act For the erection of a monument over the grave of Brigadier-General James Shields in Saint Mary's Cemetery, Carrollton, Missouri.

March 15, 1910.
[H. R. 11580.]
[Private, No. 22.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of War be, and he is hereby, authorized and directed to cause a suitable monument to be erected over the grave of Brigadier-General James Shields in Saint Mary's Cemetery, at Carrollton, Missouri, not to exceed in cost the sum of three thousand dollars.

James Shields. Monument to be erected to.
Cost.

Approved, March 15, 1910.

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March 23, 1910. [S. 6662.] [Public, No. 91.]

CHAP. 104.—An Act To authorize the Atchison, Topeka and Santa Fe Railway Company to construct and maintain a bridge across the Missouri River in the neighborhood of Sibley, Missouri, and to remove the existing structure.

Missouri River. Atchison, Topeka and Santa Fe Railway Company may bridge, at Sibley, Mo. Vol. 34, p. 84.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Atchison, Topeka and Santa Fe Railway Company is hereby authorized to construct, maintain, and operate, in connection with its railway, and in accordance with the provisions of an Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six, a new bridge across the Missouri River, at a point suitable to the interests of navigation, in the neighborhood of Sibley, Missouri, and in the vicinity of its existing bridge now constructed and maintained under authority of the Act of Congress approved March third, eighteen hundred and eighty-seven, chapter three hundred and forty-nine: *Provided*, That the superstructure and piers of the existing bridge shall be completely removed down to a plane of fifteen feet below standard low water within one year from the date of completion of the new bridge herein authorized.

Vol. 24, p. 493.

Proviso. Removal of old bridge.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, March 23, 1910.

March 23, 1910. [H. R. 11878.] [Public, No. 92.]

CHAP. 105.—An Act To change the name of Twenty-third street north of Calvert street, in the District of Columbia, to Woodley place.

District of Columbia. Part of Twenty-third street to be Woodley place.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That Twenty-third street north of Calvert street, in the District of Columbia, shall hereafter be known as Woodley place.

Approved, March 23, 1910.

March 23, 1910. [H. R. 13893.] [Public, No. 93.]

CHAP. 106.—An Act To authorize the extension of Forty-first street northwest.

District of Columbia. Forty-first street northwest. Condemning land for extending. Vol. 34, p. 151.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That under and in accordance with the provisions of subchapter one of chapter fifteen of the Code of Law for the District of Columbia, within six months after the passage of this Act, the Commissioners of the District of Columbia be, and they are hereby, authorized and directed to institute in the supreme court of the District of Columbia a proceeding in rem to condemn the land that may be necessary for the extension of Forty-first

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street northwest, from Harrison street north to Keokuk street, as now dedicated, with a width of ninety feet: *Provided, however*, That the entire amount found to be due and awarded by the jury in said proceedings as damages, for and in respect of the land to be condemned for said extension plus the costs and expenses of said proceeding, shall be assessed by the jury as benefits: *And provided further*, That nothing in said subchapter one of chapter fifteen of said code shall be construed to authorize the jury to assess less than the aggregate amount of the damages awarded for and in respect of the land to be condemned and the costs and expenses of the proceeding hereunder.

Provisos. Damages assessed as benefits.

Minimum assessment.

SEC. 2. That there is hereby authorized to be expended from the revenues of the District of Columbia an amount sufficient to pay the necessary costs and expenses of the condemnation proceedings taken pursuant hereto, and for the payment of amounts awarded as damages; to be repaid to the District of Columbia from the assessments for benefits and covered into the Treasury to the credit of the revenues of the District of Columbia.

Appropriation for expenses, etc.

Payment of awards.

Approved, March 23, 1910.

CHAP. 107.—An Act To direct that Jefferson street northwest between Fourteenth street and Colorado avenue be stricken from the plan of the permanent system of highways for the District of Columbia.

March 23, 1910. [H. R. 16915.] [Public, No. 94.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Commissioners of the District of Columbia be, and they are hereby, authorized and directed to strike from the plan of the permanent system of highways for the District of Columbia Jefferson street northwest, between Fourteenth street and Colorado avenue, and to omit the said street between the limits named from any future subdivision of the parcel of ground through which the said Jefferson street runs: *Provided*, That the owners of the parcel of ground through which the said Jefferson street between the limits named runs shall dedicate to the District of Columbia the south twenty feet of the said Jefferson street between Fourteenth street and Colorado avenue.

District of Columbia. Jefferson street stricken off of highway plan from Colorado avenue to Fourteenth street.

Proviso. Dedication from owners.

Approved, March 23, 1910.

CHAP. 108.—An Act To authorize certain changes in the permanent system of highways plan, District of Columbia.

March 23, 1910. [H. R. 16916.] [Public No. 95.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Commissioners of the District of Columbia

District of Columbia.

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New highway plan for northern section.

are hereby authorized to prepare a new highways plan for that portion of the first section of the permanent system of highways plan lying between Georgia avenue on the east, Sixteenth street on the west, Kalmia street on the north, and Butternut street on the south, under the provisions contained in the Act of Congress approved March second, eighteen hundred and ninety-three, entitled "An Act to provide a permanent system of highways in that part of the District of Columbia lying outside of cities," and an amendment to said Act approved June twenty-eighth, eighteen hundred and ninety-eight.

Vol. 27, p. 532.

Vol. 30, p. 519.

Approved, March 23, 1910.

March 23, 1910. [H. R. 19785.]

CHAP. 110.—An Act To authorize the extension of Columbia road northwest, in the District of Columbia.

[Public, No. 97.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That, under and in accordance with the provisions of subchapter one of chapter fifteen of the Code of Law for the District of Columbia, within six months after the passage of this Act, the Commissioners of the District of Columbia be, and they are hereby, authorized and directed to institute in the supreme court of the District of Columbia a proceeding in rem to condemn the land that may be necessary to extend Columbia road northwest through parcels ninety-five–two, ninety-five–four, and ninety-five–five, with a width of seventy-five feet, upon such lines as the said commissioners may deem best for the public interest: *Provided*, *however*, That the entire amount found to be due and awarded by the jury in said proceeding as damages for and in respect of the land to be condemned for said extension, plus the cost and expenses of said proceeding, shall be assessed by the jury as benefits.

District of Columbia.

Columbia road northwest.

Condemning land for extending.

Vol. 34, p. 151.

Proviso.

Damages assessed as benefits.

Appropriation for expenses.

Payment of awards.

SEC. 2. That there is hereby appropriated from the revenues of the District of Columbia an amount sufficient to pay the necessary costs and expenses of the condemnation proceedings taken pursuant hereto and for the payment of amounts awarded as damages; to be repaid to the District of Columbia from the amount for benefits and covered into the Treasury to the credit of the revenues of the District of Columbia.

Approved, March 23, 1910.

March 23, 1910. [H. R. 20164.]

CHAP. 111.—An Act Authorizing the extension of Military road northwest, in the District of Columbia.

[Public, No. 98.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That under and in accordance with the provisions

District of Columbia.

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of subchapter one of chapter fifteen of the Code of Law for the District of Columbia, within six months after the passage of this Act, the Commissioners of the District of Columbia be, and they are hereby, authorized and directed to institute in the supreme court of the District of Columbia a proceeding in rem to condemn the land that may be necessary for the extension of Military road northwest, through parcels eighty-seven–seventeen and eighty-seven–sixteen, with a width not to exceed seventy-five feet, upon such lines as the Commissioners of the said District of Columbia may deem best for the public interests: *Provided*, *however*, That the entire amount found to be due and awarded by the jury in said proceeding as damages for and in respect of the land to be condemned for said extension, plus the costs and expenses of the proceeding, shall be assessed by the jury as benefits.

Military road northwest.
Condemning land for extending.
Vol. 34, p. 151.
Proviso.
Damages assessed as benefits.

SEC. 2. That there is hereby appropriated, out of the revenues of the District of Columbia, an amount sufficient to pay the necessary costs and expenses of the said condemnation proceedings taken pursuant hereto, and for the payment of the amounts awarded as damages, to be repaid to the District of Columbia from the assessments for benefits, and covered into the Treasury to the credit of the revenues of the District of Columbia.

Appropriation for expenses, etc.
Payment of awards.

Approved, March 23, 1910.

CHAP. 112.—An Act To authorize the city of Saint Joseph, Michigan, to construct a bridge across Morrison Channel, of the Saint Joseph River, Michigan.

March 23, 1910.
[H. R. 21221.]
[Public, No. 99.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the city of Saint Joseph, a corporation organized under the laws of the State of Michigan, is hereby authorized to construct, maintain, and operate a bridge and approaches thereto, across Morrison Channel, of the Saint Joseph River, at a point suitable to the interests of navigation, at or near the city of Saint Joseph, in the county of Berrien, in the State of Michigan, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Saint Joseph River.
Saint Joseph, Mich., may bridge Morrison Channel of.
Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, March 23, 1910.

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March 23, 1910. [H. R. 13864.] [Public, No. 101.]

CHAP. 114.—An Act To extend Fourth street southeast.

District of Columbia. Extension of Fourth street southeast authorized.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of the Interior is hereby authorized and directed to open for use as a public thoroughfare a fifty-foot roadway along the line of Fourth street southeast through the United States reservation lying between Congress Heights and Washington Highlands, so as to connect Fourth street, Congress Heights, with Fourth street, Washington Highlands.

Approved, March 23, 1910.

March 23, 1910. [H. R. 15384.] [Public, No. 102.]

CHAP. 115.—An Act Making appropriation for the support of the army for the fiscal year ending June thirtieth, nineteen hundred and eleven.

Army appropriations.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums be, and they are hereby, appropriated, out of any money in the Treasury not otherwise appropriated, for the support of the army for the year ending June thirtieth, nineteen hundred and eleven.

Contingencies of the Army.

CONTINGENCIES OF THE ARMY: For all contingent expenses of the army not otherwise provided for, and embracing all branches of the military service, including the office of the Chief of Staff, to be expended under the immediate orders of the Secretary of War, forty thousand dollars.

* * * * *

CORPS OF ENGINEERS.

Engineer battalion.

For pay of enlisted men, four hundred and seventy-five thousand seven hundred and sixteen dollars.

Additional pay for length of service, sixty-six thousand dollars.

* * * * *

PAY TO CLERKS, MESSENGERS, AND LABORERS AT HEADQUARTERS OF DIVISIONS, AND DEPARTMENTS, AND POSTS COMMANDED BY GENERAL OFFICERS, AND OFFICE OF THE CHIEF OF STAFF.

* * * * *

Assignment.

Proviso. Duty in War Department forbidden.

And said clerks, messengers, and laborers shall be employed and assigned by the Secretary of War to the offices and positions in which they are to serve: *Provided*, That no clerk, messenger, or laborer at headquarters of divisions, departments, posts commanded by general officers, or office of the Chief of Staff, shall be assigned to duty with any bureau in the War Department.

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FOR PAY OF OFFICERS OF THE STAFF CORPS AND STAFF DEPARTMENTS. Staff officers.

* * * * *

THE CORPS OF ENGINEERS: For pay of officers in the Corps of Engineers, four hundred and sixty thousand three hundred dollars. Engineer Corps.

For additional pay to such officers for length of service, to be paid with their current monthly pay, one hundred and four thousand nine hundred and ninety dollars.

* * * * *

MISCELLANEOUS. Miscellaneous.

* * * * *

For additional pay to officer in charge of public buildings and grounds at Washington, District of Columbia, one thousand dollars. Officer, buildings and grounds, D. C.

* * * * *

QUARTERMASTER'S DEPARTMENT. Quartermaster's Department.

* * * * *

HORSES FOR CAVALRY, ARTILLERY, AND ENGINEERS: For the purchase of horses for officers entitled to public mounts, for the cavalry, artillery, and engineers, service school and staff colleges, and for the Indian scouts, and for such infantry and members of the Hospital Corps in field campaigns as may be required to be mounted, and the expenses incident thereto, four hundred and thirty-four thousand four hundred and eighty-seven dollars and ninety cents: *Provided*, That the number of horses purchased under this appropriation, added to the number now on hand, shall be limited to the actual needs of the mounted service, including reasonable provisions for remounts, and, unless otherwise ordered by the Secretary of War, no part of this appropriation shall be paid out for horses not purchased by contract after competition duly invited by the Quartermaster's Department and an inspection under the direction and authority of the Secretary of War. When practicable, horses shall be purchased in the open market at all military posts or stations, when needed, at a maximum price to be fixed by the Secretary of War: *Provided*, That no part of this appropriation shall be used for breeding purposes: *Provided further*, That no part of this appropriation shall be expended for the purchase of any horses below the standard set by army regulations for cavalry and artillery horses: *And provided further*, That hereafter when a mounted officer is ordered to duty beyond the seas or to make a change of station in the United States in which the cost of transportation for his author- Horses, etc. *Provisos.* Limit. Breeding. Restriction. Purchases from officers ordered to distant duty.

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ized number of owned horses exceeds the sum at the time allowed for that purpose in the Army Regulations, the Secretary of War is authorized, under such regulations in respect to inspection and valuation as he may prescribe, in his discretion to permit the purchase of said horses by the Quartermaster's Department, at a price not exceeding the average contract price paid for horses during the preceding fiscal year, the exact price to be fixed by a board of officers.

* * * * *

Engineer Department.

ENGINEER DEPARTMENT.

Incidental expenses at depots.

ENGINEER DEPOTS: For incidental expenses for the depots, including fuel, lights, chemicals, stationery, hardware, machinery, pay of civilian clerks, mechanics, and laborers, extra-duty pay to soldiers necessarily employed for periods not less than ten days as artificers on work in addition to and not strictly in the line of their military duties, such as carpenters, blacksmiths, draftsmen, printers, lithographers, photographers, engine drivers, telegraph operators, teamsters, wheelwrights, masons, machinists, painters, overseers, laborers; repairs of, and for materials to repair, public buildings, machinery, and unforeseen expenses, twenty thousand dollars.

Purchase, etc., of instruments.

For purchase and repair of instruments to be issued to officers of the Corps of Engineers and to officers detailed and on duty as acting engineer officers for use on public works and surveys, ten thousand dollars.

Engineer School, Washington Barracks, D. C. Equipment.

ENGINEER SCHOOL, WASHINGTON, DISTRICT OF COLUMBIA: Equipment and maintenance of the Engineer School at Washington Barracks, District of Columbia, including purchase of instruments, machinery, implements, models, and materials, for the use of the school and for instruction of engineer troops in their special duties as sappers and miners; for land mining, pontoniering, and signaling; for purchase and binding of professional works and periodicals of recent date treating of military and civil engineering and kindred scientific subjects for the library of the United States Engineer School: for incidental expenses of the school, including fuel, lights, chemicals, stationery, hardware, machinery, and boats; for pay of civilian clerks, draftsmen, electricians, mechanics, and laborers; for extra-duty pay to soldiers necessarily employed for periods not less than ten days as artificers on work in addition to and not strictly in the line of their military duties, such as carpenters, blacksmiths, draftsmen, printers, lithographers, photographers, engine drivers, telegraph operators, telephone operators, teamsters, wheelwrights, masons, machinists, painters, overseers, laborers: for repairs of and materials to repair public buildings and ma-

Incidental expenses.

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chinery; for unforeseen expenses; for travel expenses of officers on journeys approved by the Secretary of War and made for the purpose of instruction: *Provided*, That the traveling expenses herein provided for shall be in lieu of mileage and other allowances; and to provide means for the theoretical and practical instruction at the Engineer School by the purchase of text-books, books of reference, scientific and professional papers, and for other absolutely necessary expenses, twenty-five thousand dollars.

Traveling expenses.

Proviso. In lieu of mileage, etc. Text-books, etc.

ENGINEER EQUIPMENT OF TROOPS: For pontoon material, tools, instruments, and supplies required for use in the engineer equipment of troops, including the purchase and preparation of engineer manuals, ninety thousand dollars.

Pontoon material, etc.

For services of surveyors, survey parties, draftsmen, photographers, master laborers, and clerks to engineer officers on the staff of division, corps, and department commanders, forty thousand dollars.

Surveyors, etc.

CONTINGENCIES, ENGINEER DEPARTMENT, PHILIPPINE ISLANDS: For contingent expenses incident to the operations of the Engineer Department in the Philippine Islands, to be expended at the discretion of the Secretary of War, five thousand dollars.

Philippine Islands. Contingencies.

* * * * *

Approved, March 23, 1910.

CHAP. 123.—An Act Permitting the building of a railroad bridge across the Mississippi River at Bemidji, in the State of Minnesota.

March 24, 1910. [S. 6721.] [Public, No. 103.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress is hereby granted to the Minneapolis, Saint Paul and Sault Sainte Marie Railway Company, a railway corporation organized under the laws of the States of Wisconsin, Michigan, and Minnesota, to construct, maintain, and operate a railroad bridge and approaches thereto across the Mississippi River, at a point suitable to the interests of navigation, from a point on the east bank of said river in lot two of section sixteen, township one hundred and forty-six, range thirty-three west, to a point on the west bank of said river in lot one of said section sixteen, all in Beltrami County, Minnesota, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Mississippi River. Minneapolis, Saint Paul and Sault Sainte Marie Railway Company may bridge, at Bemidji, Minn.

Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, March 24, 1910.

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March 24, 1910. [H. R. 12897.]

[Public, No. 104.]

CHAP. 124.—An Act Granting certain rights and privileges to the department of fisheries of the State of Pennsylvania.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the department of fisheries of the State of Pennsylvania is hereby granted the right to enter upon and occupy the following-described land of the United States, known as "Presque Isle peninsula," in the county of Erie and State of Pennsylvania, to wit, all that part of said peninsula lying and being between the east line of the Erie waterworks lands and a line substantially parallel with and adjacent to the west line of the lands of the Presque Isle light-house, on the north shore of said peninsula, and the line of the present walk leading from said light-house to the north shore of Misery Bay, for the purpose of establishing and maintaining thereon a hatchery for the propagation of game and food fishes, and in pursuance thereof to improve the lands and ponds and reclaim marsh lands thereon; to construct buildings, houses, and sheds, and docks and approaches from Presque Isle Bay to said lands and to the ponds and hatchery buildings on said lands; to lay out, build, and maintain roads and walks in connection therewith, and plant trees and shrubs thereon for the preservation thereof: *Provided*, That the occupation and use of the said lands for the aforesaid purposes shall in no manner affect the right, title, and interest of the United States in and to said lands, nor the government right of passage over and across the lands so occupied; and the said department of fisheries of the State of Pennsylvania shall do nothing on said lands that may injuriously affect the harbor of Erie or the peninsula of Presque Isle as a protection for the harbor: *Provided further*, That the United States shall not be liable for any damages whatsoever that may at any time occur to the improvements of the department of fisheries of Pennsylvania on said lands: *And provided further*, That the exercise of the rights hereby granted and the execution of any work on said lands hereby authorized shall be in accordance with such plans and specifications as may be approved by the Secretary of War and subject to such further stipulations and conditions as he may prescribe.

Presque Isle peninsula, Pa. State fish hatchery permitted on.

Proviso. Title, etc., not affected.

Nonliability for damages.

Approval of plans, etc.

Amendment, etc.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, March 24, 1910.

March 26, 1910. [S. 6286.]

[Public, No. 105.]

CHAP. 126.—An Act To authorize the Copper River and Northwestern Railway Company to construct a bridge across the Copper River, in the district of Alaska, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Copper River and Northwestern Railway

Copper River, Alaska.

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Company, a corporation organized and existing under the laws of the State of Nevada, is hereby authorized to construct, operate, and maintain a bridge and its approaches thereto across the Copper River, in the district of Alaska, below the mouth of the Kotsina River, at a point suitable to the interests of navigation, about one and one-half miles north of the mouth of the Chitina River, on said company's line of railroad designated and generally known as the Chitina Branch of the Copper River and Northwestern Railway, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six; and are further authorized to construct, operate, and maintain a temporary bridge at or near the same point in accordance with the provisions of said Act to regulate the construction of bridges over navigable waters, said temporary bridge to be removed upon the completion of the bridge first above referred to.

Copper River and Northwestern Railway Company may bridge, below Kotsina River.

Vol. 34, p. 84.

Temporary structure.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, March 26, 1910.

CHAP. 127.—An Act Authorizing the village of Taylors Falls, Minnesota, and the village of Saint Croix Falls, Wisconsin, to construct a bridge across the Saint Croix River.

March 26, 1910. [S. 6851.] [Public, No. 106.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the village of Taylors Falls, Minnesota, and the village of Saint Croix Falls, Wisconsin, are hereby authorized to construct, maintain, and operate a free wagon and foot bridge, with necessary approaches, across the Saint Croix River at a point suitable to the interests of navigation, between the said villages in accordance with the provisions of an Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Saint Croix River. Taylors Falls, Minn., and Saint Croix Falls, Wis., may bridge.

Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, March 26, 1910.

CHAP. 130.—An Act To extend the time for the completion of a bridge across the Missouri River at Yankton, South Dakota, by the Yankton, Norfolk and Southern Railway Company.

March 26, 1910. [S. 6229.] [Public, No. 109.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That section six of an Act approved March ninth,

Missouri River.

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Time extended for bridging, by Yankton, Norfolk and Southern Railway Company, at Yankton, S. Dak.
Vol. 33, pp. 62, 621.
Vol. 34, pp. 9, 1058.
Vol. 35, pp. 35, 1059.

nineteen hundred and four, authorizing the Yankton, Norfolk and Southern Railway Company to construct a combined railroad, wagon, and foot-passenger bridge across the Missouri River at or near the city of Yankton, South Dakota, as amended by the Acts approved January twenty-seventh, nineteen hundred and five; February fifth, nineteen hundred and six; March second, nineteen hundred and seven; February twenty-fifth, nineteen hundred and eight; and March fourth, nineteen hundred and nine, be, and is hereby, amended by extending the time for commencing the construction of said bridge to March ninth, nineteen hundred and ten, and by extending the time for completing said bridge to March ninth, nineteen hundred and twelve.

Approved, March 26, 1910.

March 28, 1910.
[H. R. 19628.]
[Public, No. 111.]

CHAP. 135.—An Act To authorize the Lawton and Fort Sill Electric Railway Company to construct and operate a railway, telegraph, telephone, and trolley lines through the Fort Sill Military Reservation, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Lawton and Fort Sill Electric Railway Company, a corporation created under and by virtue of the laws of the State of Oklahoma, be, and the same is hereby, empowered to survey, locate, construct, maintain, and operate railway, telegraph, telephone, and trolley lines through the Fort Sill Military Reservation, in Comanche County, State of Oklahoma, upon such terms and in such location as may be determined and approved by the Secretary of War.

Fort Sill Military Reservation, Okla.
Lawton and Fort Sill Electric Railway Company granted right of way across.

Width, etc.

SEC. 2. That said corporation is authorized to occupy and use for all purposes of railway, telegraph, telephone, and trolley lines, and for no other purpose, a right of way fifty feet in width through said Fort Sill Military Reservation, with the right to use such additional ground where cuts and fills may be necessary for the construction and maintenance of the roadbed, not exceeding one hundred feet in width, or as much thereof as may be included in said cut or fill: *Provided*, That no part of the land herein authorized to be occupied shall be used except in such manner and for such purposes as shall be necessary for the construction and convenient operation of said railway, telegraph, telephone, and trolley lines; and when any portion thereof shall cease to be so used such portion shall revert to the United States: *Provided further*, That before the said railway company shall be permitted to enter upon any part of said military reservation a description by metes and bounds of the land herein authorized to be occupied or used shall be approved by the

Provisos.
Restriction of use.

Approval of location by Secretary of War.

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Secretary of War: *Provided further*, That the said railway company shall comply with such other regulations and conditions in the maintenance and operation of said road as may from time to time be prescribed by the Secretary of War. Maintenance, etc.

SEC. 3. The right to alter, amend, or repeal this Act is hereby expressly reserved. Amendment.

Approved, March 28, 1910.

CHAP. 136.—An Act To provide for the condemnation of streets or parts of streets under the plan for the permanent system of highways for the District of Columbia. March 30, 1910. [H. R. 16332.] [Public, No. 112.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That whenever in the subdivision of a tract of land in the District of Columbia the owner or owners of such tract shall reserve from subdivision any portion thereof, and shall fail to or refuse to dedicate the streets or highways within the reserved portion as shown on the plan of permanent system of highways, the Commissioners of the District of Columbia be, and they are hereby, authorized, in their discretion, to institute condemnation proceedings to acquire for street purposes in accordance with the highway plans any or all land comprised in the said streets within the limits of any portion reserved from subdivision, which the said Commissioners may deem desirable for the purpose of extending existing or proposed streets or of connecting streets already of record according to the said highway plan. District of Columbia. Permanent system of highways. Extending streets through reserved subdivisions.

SEC. 2. That the said condemnation proceedings shall be instituted under and in accordance with the provisions of subchapter one of chapter fifteen of the Code of Law for the District of Columbia: *Provided*, That the entire amount found to be due and awarded by the jury in said proceedings as damages for and in respect of the land condemned for such streets or highways, plus the cost and expenses of said proceedings, shall be assessed by the jury as benefits, under the provisions of said subchapter one of chapter fifteen of said code. And there is hereby appropriated, out of the revenues of the District of Columbia, such amount or amounts as may be necessary to pay the cost and expenses of the condemnation proceedings taken pursuant hereto and for the payment of amounts awarded as damages, to be repaid to the District of Columbia from the assessments for benefits and covered into the Treasury to the credit of the revenues of the District of Columbia. Condemnation. Vol. 34, p. 151. *Proviso.* Damages assessed as benefits. Permanent appropriation from District revenues.

Approved, March 30, 1910.

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April 2, 1910. [H. R. 22869.] [Public, No. 113.]

CHAP. 139.—An Act To amend an Act entitled "An Act to authorize the construction of a bridge across the Monongahela River, in the State of Pennsylvania, by the Liberty Bridge Company," approved March second, nineteen hundred and seven.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That section two of an Act entitled "An Act to authorize the construction of a bridge across the Monongahela River, in the State of Pennsylvania, by the Liberty Bridge Company," approved March second, nineteen hundred and seven, as amended by Acts approved March sixteenth, nineteen hundred and eight, and February eighteenth, nineteen hundred and nine, be, and is hereby, further amended to read as follows:

Monongahela River. Time extended for bridging, by Liberty Bridge Company at Pittsburg, Pa. Vol. 34, p. 1235. Vol. 35, pp. 45, 638.

Time of construction.

"SEC. 2. That this Act shall be null and void if actual construction of the bridge herein authorized be not commenced within one year and completed within three years from March fifteenth, nineteen hundred and ten."

Approved, April 2, 1910.

April 8, 1910. [S. 5252.] [Public, No. 119.]

CHAP. 145.—An Act To authorize the closing of a part of Forty-first street northwest in the District of Columbia, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Commissioners of the District of Columbia be, and they are hereby, authorized and directed to vacate and abandon Forty-first street northwest between Warren and Yuma streets, and upon the abandonment of said portion of said street the same shall revert to the property abutting thereon: *Provided, however*, That nothing in this Act shall destroy the easement for a street by dedication or otherwise, which the District of Columbia now has over the property hereby affected, but that such easement shall survive and revive at any time hereafter, when this property shall no longer be used for religious or educational purposes as it is now used.

District of Columbia. Forty-first street northwest. Closing part of.

Proviso. Easement continued.

Approved, April 8, 1910.

April 8, 1910. [H. R. 21673.] [Public, No. 121.]

CHAP. 147.—An Act Granting authority to the city of Saint Francisville, Illinois, to build a bridge across the Wabash River.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the city of Saint Francisville, State of Illinois, be, and is hereby, authorized to construct, maintain, and operate a bridge and approaches thereto across the Wabash River at a point suitable to the interests of navi-

Wabash River. Saint Francisville, Ill., may bridge.

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gation between said city, in the State of Illinois, and the State of Indiana, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six. Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved. Amendment.

Approved, April 8, 1910.

CHAP. 148.—An Act To authorize the board of commissioners of Lake County, Indiana, to construct and maintain a bridge across the Grand Calumet River, in the city of Hammond, Indiana. April 8, 1910. [H. R. 22459.] [Public, No. 122.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the board of commissioners of Lake County, Indiana, is hereby authorized to construct, maintain, and operate a bridge across the Grand Calumet River at a point suitable to the interests of navigation upon or near Hopman street, in the city of Hammond, Lake County, Indiana, in accordance with the provisions of an Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six. Grand Calumet River. Lake County, Ind., may bridge, at Hammond. Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved. Amendment.

Approved, April 8, 1910.

CHAP. 150.—An Act Authorizing the construction of a bridge across the Columbia River, in the counties of Okanogan and Douglas, Washington. April 9, 1910. [S. 6793.] [Public, No. 124.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Okanogan Electric Railway Company, a corporation organized under the laws of the State of Washington, is hereby authorized to construct, maintain, and operate a bridge and approaches thereto across the Columbia River, between the counties of Okanogan and Douglas, at a point suitable to the interests of navigation, at the town of Bridgeport, in the State aforesaid, in accordance with the provisions of an Act of Congress entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six. Columbia River. Okanogan Electric Railway Company may bridge, at Bridgeport, Wash. Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved. Amendment.

Approved, April 9, 1910.

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April 9, 1910. [S. 6794.] [Public, No. 125.]

CHAP. 151.—An Act Authorizing the construction of a bridge across the Okanogan River in the county of Okanogan, Washington.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Okanogan Electric Railway Company, a corporation organized under the laws of the State of Washington, is hereby authorized to construct, maintain, and operate a bridge and approaches thereto across the Okanogan River in the county of Okanogan, Washington, at a point suitable to the interests of navigation, at or near Defflins Ferry, about seven and one-half miles from the junction of said Okanogan River with the Columbia River, in accordance with the provisions of an Act of Congress entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Okanogan River.
Okanogan Electric Railway Company may bridge, at Defflins Ferry, Wash.
Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, April 9, 1910.

April 12, 1910. [S. 7246.] [Public, No. 182.]

CHAP. 158.—An Act Granting a right of way to the Milwaukee, Sparta and Northwestern Railway Company, a subsidiary company of the Chicago and Northwestern Railway Company, across the military reservation (United States artillery target range and maneuver grounds) near Sparta, Monroe County, Wisconsin.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of the United States is hereby given to the Milwaukee, Sparta and Northwestern Railway Company, a subsidiary company of the Chicago and Northwestern Railway Company, to locate, construct, maintain, and operate a railroad upon and across the military reservation used for artillery target range and maneuver purposes, near Sparta, in Monroe County, Wisconsin, upon such location and under such regulations and conditions as shall be approved by the Secretary of War.

Sparta, Wis.
Milwaukee, Sparta and Northwestern Railway Company granted right of way across army target range at.

Amendment.

SEC. 2. The right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, April 12, 1910.

April 15, 1910. [H. R. 21755.] [Public, No. 185.]

CHAP. 165.—An Act To authorize the towns of Warren and Barrington, Rhode Island, or either of them, to construct a bridge across Palmers or Warren River, in the State of Rhode Island.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the town of Warren and the town of Barrington, or either of them, municipal corporations organized under the laws of the State of Rhode Island, are hereby authorized to construct, maintain, and operate a bridge,

Palmers or Warren River.
Barrington and Warren, R. I., may bridge.

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without a draw, and with approaches thereto, across the Palmers or Warren River at a point suitable to the interests of navigation, at or near the point of their existing bridge across said river, in the county of Bristol, in the State of Rhode Island, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six. Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act, including the right to require the insertion of a suitable draw in the bridge herein authorized, or the removal of said bridge in whole or in part, in all cases at the expense of the owners thereof, is hereby expressly reserved. Amendment, etc.

Approved, April 15, 1910.

CHAP. 166.—An Act To authorize Leonard J. Hackney, of Cincinnati, Ohio, and Frank L. Littleton, of Indianapolis, Indiana, to construct a bridge across the Wabash River near the city of Mount Carmel, Illinois.

April 15, 1910.
[H. R. 23186.]
[Public, No. 136.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That Leonard J. Hackney, of the city of Cincinnati, State of Ohio, and Frank L. Littleton, of the city of Indianapolis, State of Indiana, and their assigns, are hereby authorized to construct, maintain, and operate a bridge and approaches thereto across the Wabash River, at a point suitable to the interests of navigation, at or near the city of Mount Carmel, in the county of Wabash, in the State of Illinois, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six. Wabash River. Leonard J. Hackney and Frank L. Littleton may bridge, at Mount Carmel, Ill. Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved. Amendment.

SEC. 3. That the Act entitled "An Act to authorize the construction of a bridge across the Wabash River," approved June thirtieth, nineteen hundred and six, is hereby repealed. Former act repealed. Vol. 34, p. 820.

Approved, April 15, 1910.

CHAP. 168.—An Act For the erection of a memorial monument at Fort Recovery, Ohio.

April 15, 1910.
[H. R. 2265.]
[Public, No. 138.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of War be, and he is hereby, authorized and directed to erect a suitable memorial monument on the grounds at Fort Recovery, Ohio, where lie buried the remains of General Richard Butler; Colonel Oldham; Majors Ferguson, Hart, and Clark; Captains Bradford, Phelon, Kirkwood, Price, Van Swearingen, Fort Recovery, Ohio. Memorial monument to officers and soldiers killed by Indians in 1791 and 1794.

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Tipton, Purdy, Smith, Piatt, Gaither, Crebbs, and Newman; Lieutenants Spear, Warren, Boyd, McMath, Burgess, Kelso, Read, Little, Hopper, and Likens; Ensigns Cobb, Balch, Chase, Turner, Wilson, Brooks, Beatty, and Purdy; Quartermasters Reynolds and Ward; Adjutants Anderson and Doc. Grasson; twenty-three other officers; and six hundred and thirty American soldiers who, while under the command of General Saint Clair, were slaughtered by the Indians of the Northwest Territory, at the battle of Fort Recovery, Ohio, on the morning of November fourth, seventeen hundred and ninety-one. And also where lie buried the remains of Major McMahon, Captain Hartshorn, Lieutenant Craig, nineteen other commissioned and noncommissioned officers, and one hundred and twenty soldiers who, while under the command of Major McMahon, gallantly defended Fort Recovery against the attacks of two thousand Indians and British soldiers on the thirtieth of June and the first of July, seventeen hundred and ninety-four.

Appropriation.

SEC. 2. That for the above purpose the expenditure of the sum of twenty-five thousand dollars, or so much of said sum as may be necessary, be hereby authorized. This sum shall be expended by direction of the Secretary of War, or such officer as he may designate: *Provided*, That the money hereby authorized shall be drawn from time to time only as may be required during the progress of the work and under the requisition of the Secretary of War: *And provided further*, That no part of said amount shall be expended until such time as the Secretary of War is satisfied that a responsible legal association is created and pledged to care for and maintain whatever memorial monument is erected and a suitable site is provided on which it can be located.

Provisos. Expenditure.

Condition.

Approved, April 15, 1910.

April 19, 1910. [H. R. 19633.]

CHAP. 175.—An Act To authorize Aransas Terminal Railroad to construct a bridge across Morris and Cumming Channel.

[Public, No. 140.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Aransas Terminal Railroad, a corporation organized under the laws of the State of Texas, is hereby authorized to construct, maintain, and operate a bridge and approaches thereto across the Morris and Cumming Channel, at a point suitable to the interests of navigation, at or near Aransas Pass, in the county of San Patricio, in the State of Texas, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Morris and Cumming Channel.

Aransas Terminal Railroad may bridge, at Aransas Pass, Tex.

Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, April 19, 1910.

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CHAP. 178.—An Act Authorizing the extension of Princeton place northwest, in the District of Columbia.

April 20, 1910.
[H. R. 19636.]
[Public, No. 142.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That, under and in accordance with the provisions of subchapter one of chapter fifteen of the Code of Law for the District of Columbia, within six months after the passage of this Act, the Commissioners of the District of Columbia be, and they are hereby, authorized and directed to institute in the supreme court of the District of Columbia a proceeding in rem to condemn the land that may be necessary for the extension of Princeton place northwest, from Georgia avenue to Rock Creek Church road northwest, with a width not less than sixty feet, upon such lines as the Commissioners of said District of Columbia may deem best for the public interest: *Provided, however*, That the entire amount found to be due and awarded by the jury in said proceeding as damages for and in respect to the land to be condemned for said extension, plus the costs and expenses of the proceeding, shall be assessed by the jury as benefits.

District of Columbia.
Princeton place northwest.
Condemning land for extending.
Vol. 34, p. 151.
Proviso.
Damages, etc., assessed as benefits.

SEC. 2. That there is hereby appropriated, out of the revenues of the District of Columbia, an amount sufficient to pay the necessary costs and expenses of the said condemnation proceedings taken pursuant hereto and for the payments of the amounts awarded as damages, to be repaid to the District of Columbia from the assessments for benefits and covered into the Treasury to the credit of the revenues of the District of Columbia.

Appropriation for expenses.
Payment of awards.

Approved, April 20, 1910.

CHAP. 179.—An Act To change the name of the west side of Fifteenth street northwest, between I and K streets, to McPherson place.

April 20, 1910.
[H. R. 19787.]
[Public, No. 143.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the portion of Fifteenth street northwest, between I and K streets, on the west side of McPherson square, shall be, and the same is hereby, designated McPherson place, and the surveyor of the District of Columbia is hereby directed to enter such change on the records of his office.

District of Columbia.
McPherson place.
Portion of Fifteenth street NW. so designated.

Approved, April 20, 1910.

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April 22, 1910. [S. 7304.] [Public, No. 150.]

CHAP. 188.—An Act To revive and extend the provisions of an Act entitled "An Act to authorize the South and Western Railroad Company to construct bridges across the Clinch River and the Holston River, in the States of Virginia and Tennessee."

Clinch and Holston rivers, Va. and Tenn. Time extended for bridging by South and Western Railroad Company. Vol. 34, p. 191.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Act entitled "An Act to authorize the South and Western Railroad Company to construct bridges across the Clinch River and the Holston River, in the States of Virginia and Tennessee," approved May twelfth, nineteen hundred and six, be, and the same is hereby, revived and reenacted, and the time for commencing and completing the bridges therein authorized is hereby extended one year and three years respectively, from May twelfth, nineteen hundred and ten.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, April 22, 1910.

April 22, 1910. [S. 7499.] [Public, No. 151.]

CHAP. 189.—An Act To authorize the Sanford and Everglades Railroad Company to construct and maintain a bridge across the eastern end of Lake Jessup.

Lake Jessup, Fla. Sanford and Everglades Railroad Company may bridge. Vol. 34, p. 84.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Sanford and Everglades Railroad Company, a corporation created under and by virtue of the laws of the State of Florida, be, and is hereby, authorized to construct and maintain a railroad bridge across the eastern end of Lake Jessup, at a point suitable to the interests of navigation in township twenty south, range thirty-one east, in Orange County, in the State of Florida, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, April 22, 1910.

April 27, 1910. [H. R. 23254.] [Public, No. 154.]

CHAP. 194.—An Act To give a legal status to a submarine cable crossing the Mississippi River between Cairo, Illinois, and Bird Point, Missouri.

Mississippi River. Southeast Missouri Telephone Company may lay cable across, from Cairo, Ill., to Bird Point, Mo.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the crossing of the submarine cable of the Southeast Missouri Telephone Company, of Charleston, Missouri, across the Mississippi River from Cairo, Illinois, to Bird Point, Missouri, be, and the same is hereby, legalized, and the consent of Congress is hereby given to its maintenance by said company, subject, however, to all

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the provisions of the statutes now or hereafter in force relating to the preservation and protection of navigable waters: *Provided*, That any changes in the said crossing which the Secretary of War may at any time deem necessary and order in the interest of navigation shall be promptly made by the owners thereof at their own expense: *Provided further*, That within sixty days from the approval of this Act, the said company shall furnish, for the files of the War Department, a drawing showing the location and plan of the cable crossing with reference to the banks, bed, and low water surface of the river.

Provisos. Changes.

Secretary of war to approve plans, etc.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, April 27, 1910.

CHAP. 200.—An Act To authorize commissions to issue in the cases of officers of the army retired with increased rank.

May 6, 1910. [S. 1025.]

[Public, No. 157.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That officers of the army on the retired list whose rank has been, or shall hereafter be, advanced by operation of or in accordance with law shall be entitled to and shall receive commissions in accordance with such advanced rank.

Army. Commissions to officers advanced on retired list.

Approved, May 6, 1910.

CHAP. 205.—An Act To give the consent of Congress to the building of a bridge by the cities of Marinette, Wisconsin, and Menominee, Michigan, over the Menominee River.

May 6, 1910. [S. 7360.]

[Public, No. 162.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress be, and is hereby, given to the cities of Marinette, in the State of Wisconsin, and Menominee, in the State of Michigan, to construct and maintain a bridge, and approaches thereto, over the Menominee River, between the States of Wisconsin and Michigan, from a point suitable to the interests of navigation at or near the foot of Hattie street, in the city of Marinette, Wisconsin, to a point in the city of Menominee, Michigan, on the Michigan shore of the Menominee River, immediately east of the west line of section three, township thirty-one north, range twenty-seven west of the principal meridian of Michigan, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Menominee River. Marinette, Wis., and Menominee, Mich., may bridge.

Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, May 6, 1910.

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May 6, 1910. [S. 7673.] [Public, No. 163.]

CHAP. 206.—An Act To authorize the construction of a bridge across Town Creek, North Carolina.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Wilmington, Brunswick and Southern Railroad Company, a corporation organized under the laws of the State of North Carolina, be, and is hereby, authorized to construct and maintain a bridge and approaches thereto across Town Creek, at a point suitable to the interests of navigation, in Brunswick County, North Carolina, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Town Creek, N. C.
Wilmington, Brunswick and Southern Railroad Company may bridge.
Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, May 6, 1910.

May 6, 1910. [H. R. 1014.] [Public, No. 164.]

CHAP. 207.—An Act Providing for the repair and rebuilding of the road from Harrisonville, New Jersey, to the post of Fort Mott, New Jersey, and the national cemetery at Finns Point, New Jersey.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the sum of ten thousand dollars, or so much thereof as may be necessary, be, and is hereby, appropriated, out of any money in the Treasury not otherwise appropriated, for the purpose of repairing and rebuilding the road leading from Harrisonville, New Jersey, to the post of Fort Mott, New Jersey, and the national cemetery at Finns Point, New Jersey; said sum to be expended under the direction of the Secretary of War: *Provided*, That no work shall be begun on said road until the consent of the local municipal authorities is obtained.

Harrisonville, N. J.
Appropriation for road to Fort Mott, and Finns Point national cemetery.
Proviso. Municipal consent.

Approved, May 6, 1910.

May 6, 1910. [H. R. 23255.] [Public, No. 167.]

CHAP. 210.—An Act To authorize Butler and Stoddard counties of Missouri to construct a bridge across the Saint Francis River at Fisk, Missouri.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the counties of Butler and Stoddard, in the State of Missouri, corporations organized under the laws of the State of Missouri, are hereby authorized to construct, maintain, and operate a bridge, and approaches thereto, across the Saint Francis River, at a point suitable to the interests of navigation, at or near Fisk, Missouri, in the county of Butler, in the State of Missouri, in accordance with the provisions of the Act entitled "An

Saint Francis River.
Butler and Stoddard counties may bridge, at Fisk, Mo.
Vol. 34, p. 84.

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Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved. Amendment.

Approved, May 6, 1910.

CHAP. 217.—An Act Providing for the raising of the United States battle ship Maine, in Habana Harbor, and to provide for the interment of the bodies therein. May 9, 1910. [H. R. 23012.] [Public, No. 169.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of War and the Chief of Engineers are hereby authorized and directed to provide with all convenient speed for the raising or the removal of the wreck of the United States battle ship Maine from the harbor of Habana, Cuba, and for the proper interment of the bodies therein, in Arlington Cemetery; and the Secretary of War is authorized and directed to remove the mast of the wreck of said battle ship Maine and place the same upon a proper foundation in Arlington National Cemetery at or near the spot where the bodies of those who died through such wreck are interred: *Provided, however*, That the consent in proper form of the Republic of Cuba shall be first obtained. The sum of one hundred thousand dollars is hereby appropriated, out of any money in the Treasury not otherwise appropriated, on account of the work herein authorized.

"Battle ship Maine."
Wreck to be removed from Habana Harbor.
Interment of bodies, etc.
Proviso. Consent from Cuba.
Appropriation.
Post, p. 2906.

Approved, May 9, 1910.

CHAP. 225.—An Act To authorize the opening of a road along the Anacostia River in the District of Columbia. May 10, 1910. [H. R. 19038.] [Public, No. 170.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That under and in accordance with the provisions of an Act entitled "An Act to amend an Act entitled 'An Act to establish a Code of Law for the District of Columbia,' regulating proceedings for condemnation of land for streets," approved April thirtieth, nineteen hundred and six, known as subchapter one of chapter fifteen of the Code of Law of the District of Columbia, except section four hundred and ninety-one g of said subchapter, which section shall not be applicable to this Act, the Commissioners of the District of Columbia be, and they are hereby, authorized and directed to institute in the supreme court of the District of Columbia a proceeding in rem to condemn and acquire the fee simple and absolute title, including all riparian rights and all other rights pertaining thereto, to a strip of land for a public highway and

District of Columbia.
Road along Anacostia River.
Condemning land for.
Vol. 34, pp. 151, 930.

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Location. for park purposes along the Anacostia River and bounded by said river, from Monroe street extended to the right of way of the outfall sewer at and near Poplar Point and from the southwest corner of the grounds of the Government Hospital for the Insane along said Anacostia River to Giesboro Point, near the western terminus of Memphis street, as shown on the permanent system of highway plans for the District of Columbia. The northern and western boundary of said strip of land shall be coincident with the high-water line of the said Anacostia River, and the southern and eastern boundary of the said strip of land shall be not more than one hundred and sixty feet therefrom: *Provided*, That of the amount found due and awarded as damages for and in respect of the land condemned under this Act for the said public highway and park not less than one-half thereof, together with all the costs and expenses of the proceeding or proceedings taken pursuant hereto, shall be assessed as benefits by the jury in said proceeding against the lots, pieces, or parcels of ground lying on the side or sides of the extension of the said public highway and park and also on all or any adjacent pieces or parcels of land which will be benefited by the said public highway and park as herein provided: *And provided further*, That the sums to be assessed against each lot, piece, or parcel of ground shall be determined and designated by the jury, and in determining what amount shall be assessed against any particular lot, piece, or parcel of ground the jury shall take into consideration the situation of the said lot, piece, or parcel of ground and the benefits they may severally receive from the opening of the said public highway and park.

Provisos.

One-half of damages assessed as benefits.

Determination of benefits.

Appropriation for benefits, etc.

SEC. 2. That there is hereby appropriated out of the revenues of the District of Columbia an amount sufficient to pay the costs and expenses of the condemnation proceedings taken pursuant hereto and for the payment of amounts awarded as damages, one-half of the said amount to be repaid to the District of Columbia from the assessments for benefits and covered into the Treasury to the credit of the revenues of the District of Columbia.

Repayment.

Approved, May 10, 1910.

May 13, 1910. [S. 7981.]

[Public, No. 177.]

CHAP. 235.—An Act Authorizing the connecting of a channel with Island End River, in Chelsea, Massachusetts.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the New England Gas and Coke Company is hereby authorized to dredge and remove all that part of the United States Naval Hospital grounds, at Chelsea, Massachusetts, comprising about seven thousand five hundred square feet, more or less, situated at the northwest extremity of said grounds, lying within the lines of the

Naval Hospital, Chelsea, Mass.

Dredging channel for Island End River across grounds of, authorized.

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protected channel to be dredged and established by said company in continuation of the Island End River across the peninsula formed by the bend in said river at the head thereof: *Provided*, That the dredging of said channel be approved and authorized by the Secretary of War; that the said channel opposite the hospital grounds fronting thereon shall be dredged to a depth of twenty feet below mean low water, and a width of not less than one hundred and fifty feet at that depth; and that the said water front of the hospital grounds shall be stayed and protected in such manner as shall, in the judgment of the Secretary of the Navy, be sufficient for its preservation: *And provided further*, That the United States shall be at no expense on account of the work herein authorized; and that when said channel shall be dredged and finished it shall be, and forever remain, a public water highway.

Provisos. Approval of Secretary of War.

Protection of water front.

No expense, etc.

Approved, May 13, 1910.

CHAP. 243.—An Act Establishing a Commission of Fine Arts.

May 17, 1910. [H. R. 19962.]

[Public, No. 181.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That a permanent Commission of Fine Arts is hereby created to be composed of seven well-qualified judges of the fine arts, who shall be appointed by the President, and shall serve for a period of four years each, and until their successors are appointed and qualified. The President shall have authority to fill all vacancies. It shall be the duty of such commission to advise upon the location of statues, fountains, and monuments in the public squares, streets, and parks in the District of Columbia, and upon the selection of models for statues, fountains, and monuments erected under the authority of the United States and upon the selection of artists for the execution of the same. It shall be the duty of the officers charged by law to determine such questions in each case to call for such advice. The foregoing provisions of this Act shall not apply to the Capitol building of the United States and the building of the Library of Congress. The commission shall also advise generally upon questions of art when required to do so by the President, or by any committee of either House of Congress. Said commission shall have a secretary and such other assistance as the commission may authorize, and the members of the commission shall each be paid actual expenses in going to and returning from Washington to attend the meetings of said commission and while attending the same.

Commission of Fine Arts created.

Composition.

Advisory duties as to statues, etc., in District of Columbia.

Not applicable to Capitol and Library of Congress.

Secretary, etc.

Post, p. 2901.

SEC. 2. That to meet the expenses made necessary by this Act an expenditure of not exceeding ten thousand dollars a year is hereby authorized.

Expenditure authorized.

Post, p. 2901.

Approved, May 17, 1910.

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May 17, 1910. [H. R. 23906.] [Public, No. 182.]

CHAP. 244.—An Act To authorize and direct certain extensions of the City and Suburban Railway of Washington, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the City and Suburban Railway of Washington be, and it is hereby, authorized and directed to remove its double tracks from Michigan avenue, and to restore the roadbed of the said Michigan avenue with macadam, to the satisfaction of the Commissioners of the District of Columbia, from the intersection thereof with Monroe street northeast eastwardly to the tracks of the Baltimore and Ohio Railroad and to extend its double tracks on Monroe street northeast eastwardly from said intersection and over the Monroe Street Bridge to Twelfth street northeast; thence on Twelfth street northwardly to the Bunker Hill road; and thence northwardly, on such streets, avenues, or roads as may be designated by the Commissioners of the District of Columbia, to the boundary line of the District of Columbia.

District of Columbia. City and Suburban Railway. Extension of tracks, etc.

SEC. 2. That the removal of existing tracks east of the intersection of Monroe street and Michigan avenue and the extension of the new double track on Monroe street to Twelfth street northeast and on Twelfth street northeast from Monroe street to the Bunker Hill road shall be completed within nine months from the date of the passage of this Act; and the construction of that portion of the extension herein authorized from the Bunker Hill road to the District line shall be commenced within one year from the date of the opening and grading of the streets as designated and completed within one year thereafter; and in default of the commencement or completion, by said City and Suburban Railway of Washington, of any extension herein authorized within the period herein set for such commencement or completion said company shall be liable to a fine of twenty-five dollars for each and every day during which such failure or neglect shall continue, which penalty may be recovered in the name of the District of Columbia by the Commissioners of the said District in any court of competent jurisdiction. And the cost of widening any roadway in which the tracks herein authorized shall be laid to sufficient width, in the opinion of the Commissioners of the District of Columbia, to reasonably accommodate vehicular travel, including the relaying and readjustment of every public appurtenance, shall be paid by the City and Suburban Railway of Washington. In the event of the failure or refusal of the said company to make the necessary deposits with the collector of taxes to pay the cost of said work the commissioners are hereby authorized to do the work as above and to pay for the same from the then current appropriation for repairs to streets and to collect the amount of said expenditures from the said railway company in

Removal of existing tracks. Time of construction. Penalty for failure. Widening roadways. Deposit for cost, etc.

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the same manner as the cost of laying pavements between the rails and tracks of street railways, as provided in section five of "An Act providing a permanent form of government for the District of Columbia," approved June eleventh, eighteen hundred and seventy-eight; said amount, when collected as above, to be placed to the credit of the appropriation for repairs to streets for the fiscal year in which it is collected.

Vol. 20, p. 105.

SEC. 3. That the said City and Suburban Railway of Washington shall have, over and respecting the routes herein provided for, the same rights, powers and privileges, duties and obligations, as it has and hereafter may have by law over and respecting its present route, and shall be subject in respect thereto to all the other provisions of its charter and of law.

Rights, privileges, etc.

SEC. 4. That all laws or parts of laws inconsistent with the provisions hereof are hereby repealed.

Inconsistent laws repealed.

SEC. 5. That Congress reserves the right to alter, amend, or repeal this Act.

Amendment.

Approved, May 17, 1910.

CHAP. 245.—An Act Authorizing the Secretary of Commerce and Labor to construct a water main and electric cable across Galveston Channel to furnish water and light to the immigration station.

May 17, 1910. [H. R. 20988.] [Public, No. 183.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That for the purpose of supplying the immigration and life-saving stations at Galveston, Texas, with fresh water, lights, and other electric conveniences, the Secretary of Commerce and Labor be, and hereby is, authorized to cause to be constructed, across Galveston Channel, a water main not less than eight inches in diameter, and such suitable electric cable or cables as may be deemed necessary for the purposes above stated, at a total cost not to exceed the sum of twenty-one thousand dollars.

Galveston Channel, Tex. Water main and electric cable authorized across.

Cost.

SEC. 2. That said work shall be done under the supervision and control of the Secretary of War.

Supervision by Secretary of War.

SEC. 3. That the Secretary of Commerce and Labor is hereby authorized to receive from the city of Galveston, Texas, the sum of ten thousand dollars and to apply the same to the purposes herein stated, and that in consideration of said sum to be paid by said city the said city of Galveston shall have the right, under such rules and regulations and limitations as may from time to time be prescribed by the United States Government, to make connection with said water main and to use water therefrom for municipal and commercial purposes and for the use of itself and customers.

Contribution by Galveston.

Connection with main.

SEC. 4. That the right to alter, amend or repeal this Act is hereby expressly reserved.

Amendment.

Approved, May 17, 1910.

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May 18, 1910. [S. 2781.] [Public, No. 184.]

CHAP. 247.—An Act To provide for the extension of Nineteenth street from Belmont road to Biltmore street, in the District of Columbia, with a uniform width of fifty feet, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That within six months after the passage of this Act the Commissioners of the District of Columbia be, and they are hereby, authorized and directed to institute in the supreme court of the District of Columbia, sitting as a district court, under and in accordance with the terms and provisions of subchapter one of chapter fifteen of the Code of Law for the District of Columbia, a proceeding in rem to condemn the land necessary for the extension of Nineteenth street from Belmont road, formerly Woodley road, to Biltmore street, formerly Baltimore street, in the District of Columbia, with a uniform width of fifty feet: *Provided, however*, That the entire amount found to be due and awarded by the jury in said proceeding as damages for and in respect of the land to be condemned for said extension, plus the costs and expenses of said proceeding and the costs and expenses of the proceeding heretofore taken by said commissioners for the extension of said street, under the Act approved March third, nineteen hundred and five, shall be assessed by the jury as benefits against those lots, pieces, or parcels of land situate, lying, and being within the zone bounded as follows: Beginning on the north side of Calvert street, Cliffbourne, at the dividing line between lots numbered thirty-one and thirty-two, square numbered twenty-five hundred and forty-seven; thence north one hundred and ten and five-tenths feet; thence south eighty-seven degrees thirty-three minutes west along the north line of Cliffbourne to Rock Creek; thence westerly to the southeast corner of square numbered twenty-two hundred and five (block numbered twenty-one, Woodley Park); thence north eighty-four degrees fifty-one minutes west forty-five feet; thence north twenty-four degrees twenty-six minutes west to the north side of said square numbered twenty-two hundred and five; thence north eighty degrees thirty-four minutes west to the east line of Connecticut avenue; thence south twenty-four degrees twenty-six minutes east to the northwest corner of lot numbered two, square numbered twenty-two hundred and two (block numbered twenty-two, Woodley Park); thence easterly to the north corner of lot numbered seven, in said square numbered twenty-two hundred and two; thence southeasterly along the north line of said lot numbered seven, square numbered twenty-two hundred and two, to Cathedral avenue; thence southeasterly to the north corner of lot numbered forty-three, square numbered twenty-five hundred and forty-two; thence easterly along Belmont road to the northwest corner of square numbered twenty-

District of Columbia.
Nineteenth street northwest.
Condemning land for extending.
Vol. 34, p. 151.
Provisos.
Damages assessed as benefits.
Vol. 33, p. 1007.
Lots affected.

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five hundred and thirty-nine; thence southeasterly along the west side of square numbered twenty-five hundred and thirty-nine to Kalorama road; thence easterly along Kalorama road to Columbia road, and northward along Columbia road to Biltmore street; thence west along Biltmore street to Cliffbourne place, and along Cliffbourne place and across Calvert street to the place of beginning: *Provided, however*, That nothing in said subchapter one of chapter fifteen of said code shall be construed to authorize the jury to assess less than the aggregate amount of the damages awarded for and in respect of the land to be condemned and the cost and expenses of the proceedings hereunder and the aforesaid proceeding heretofore instituted for the extension of said Nineteenth street against said lots, pieces, or parcels of land as benefits.

Restriction.

Appropriation for expenses, etc.

SEC. 2. That there is hereby appropriated, one-half from the revenues of the District of Columbia and one-half from any moneys in the Treasury not otherwise appropriated, an amount sufficient to pay the necessary costs and expenses of the condemnation proceedings taken pursuant hereto and for the payment of amounts awarded as damages, to be repaid to the District of Columbia from the assessments for benefits and covered into the Treasury to the credit of the revenues of the District of Columbia and the United States in equal parts.

Payment of award.

Former act repealed. Vol. 33, p. 1007.

SEC. 3. That the Act approved March third, nineteen hundred and five, entitled "An Act for the extension of Nineteenth street from Woodley road to Baltimore street," be, and the same is hereby, repealed, and the Commissioners of the District of Columbia are hereby authorized and directed to discontinue and abandon the proceeding heretofore instituted by them under said Act for the extension of said Nineteenth street, now pending in the supreme court of the District of Columbia and known as district court cause numbered six hundred and fifty-three.

Proceedings discontinued.

Approved, May 18, 1910.

CHAP. 248.—An Act Making appropriations to provide for the expenses of the government of the District of Columbia for the fiscal year ending June thirtieth, nineteen hundred and eleven, and for other purposes.

May 18, 1910.
[H. R. 14464.]
[Public, No. 185.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the half of the following sums named, respectively, is hereby appropriated, out of any money in the Treasury not otherwise appropriated, and the other half out of the revenues of the District of Columbia, in full for the purposes following, being for the expenses of the government of the District of Columbia for the fiscal

District of Columbia appropriations.
Half from District revenues.

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year ending June thirtieth, nineteen hundred and eleven, namely:

General expenses.

GENERAL EXPENSES.

Executive office.

EXECUTIVE OFFICE: * * * Additional compensation

Assistants to Engineer Commissioner.

for two assistants to the engineer commissioner, detailed

Vol. 20, p. 103.

from the Engineer Corps of the United States Army, under Act of Congress approved June eleventh, eighteen

Superintendents, District building.

hundred and seventy-eight, two, at two hundred and fifty dollars each, and the two assistants to the engineer commissioner shall hereafter also act jointly as superintendent of the municipal building * * *.

* * * * *

CONTINGENT AND MISCELLANEOUS EXPENSES.

* * * * *

Reservation 185.

Transfer for property yard.

The Chief of Engineers of the United States Army is hereby authorized and directed to transfer to the Commissioners of the District of Columbia the control and jurisdiction over reservation one hundred and eighty-five, to be used by said District as a property yard: *Provided*,

Proviso.

Use for park.

That when in the judgment of the Chief of Engineers of the United States Army the use of said reservation for park purposes is desirable, the Commissioners of the District of Columbia, upon his request, are authorized and directed to retransfer said reservation to his jurisdiction.

* * * * *

Improvements and repairs.

IMPROVEMENTS AND REPAIRS.

* * * * *

Highway bridge.

Highway bridge across Potomac River: Two draw operators, at one thousand and twenty dollars each; draw operator, seven hundred and twenty dollars; four watchmen, at six hundred dollars each; labor, one thousand five hundred dollars; lighting, power, and miscellaneous supplies, and expenses of every kind necessarily incident to the operation and maintenance of the bridge and approaches, nine thousand three hundred and forty dollars; in all sixteen thousand dollars.

* * * * *

Washington Aqueduct.

WASHINGTON AQUEDUCT.

Maintenance.

For operation, including salaries of all necessary employees, maintenance, and repair of the Washington Aqueduct and its accessories, including Conduit road, the McMillan Park reservoir, and Washington Aqueduct

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tunnel, and also including the purchase and maintenance of one motor truck, horses, vehicles, and harness, and the care and maintenance of the stable, thirty-three thousand dollars.

Filtration plant.

For care, including salaries of all necessary employees, maintenance, and operation of the Washington Aqueduct, District of Columbia, filtration plant, and for each and every purpose connected therewith, eighty-two thousand dollars.

Emergency fund.

For emergency fund, to be used only in case of a serious break requiring immediate repair in one of the important aqueduct or filtration plant structures, such as a dam, conduit, tunnel, bridge, building, or important piece of machinery, all expenditures from this appropriation to be reported in detail to Congress, five thousand dollars.

McMillan Park reservoir.

For continuation of parking grounds around McMillan Park reservoir, formerly known as Washington City reservoir, two thousand dollars.

Coagulant plant.

For the construction of works to provide for the preliminary treatment of Potomac water by means of a coagulant, for purchase of coagulant, and for each and every purpose connected with the construction and operation of the plant, twenty-seven thousand five hundred dollars.

Meters for Government Printing Office, etc.

For the purchase, installation, and maintenance of water meters to be placed on water services of the Government Printing Office, the United States Navy-Yard, and the Municipal building of the District of Columbia, said meters to be purchased, installed, maintained and remain under the observation and control of the officer in charge of the Washington Aqueduct, seven thousand dollars.

* * * * *

Inconsistent laws repealed.

SEC. 7. That all laws and parts of laws to the extent that they are inconsistent with this Act are repealed.

Approved, May 18, 1910.

May 19, 1910. [S. J. Res. 97.] [Pub. Res. No. 33.]

[No. 29.] Joint Resolution Authorizing the construction and maintenance of wharves, piers, and other structures in Lake Michigan, adjoining certain lands in Lake County, Indiana.

Lake Michigan. Wharves, etc., in, authorized in Lake County, Ind.

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress is hereby given that the owners of the property known as sections numbered thirty-two and twenty-nine, township thirty-seven north, range eight west of the second principal meridian, Lake County, Indiana, may fill the whole, or such portions thereof as they may elect, of the bed of Lake Michigan adjacent to such property and within the boundary established by the extension north of the east line of said

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section thirty-two and the west line of said section twenty-nine, out to a depth of water not exceeding twenty-five feet as now existing, and that such owners may build wharves, piers, and such other structures as may be useful for occupancy, or to promote navigation, inside of and out to said twenty-five-foot line: *Provided*, That the work of construction shall be according to plans approved by the Secretary of War and Chief of Engineers: *Provided further*, That the Secretary of War and Chief of Engineers may impose such conditions as in their judgment are proper as to the construction and supervision of the work and as to the maintenance and management of the work when completed, and on the failure at any time to comply with such conditions the consent hereby given shall be deemed to be revoked without further action of Congress: *And provided further*, That nothing herein contained shall be construed as conferring any right, power, or privilege in conflict with any law or statute of the State of Indiana, in which said property is located, or to authorize any injury to private property or invasion of private rights.

Proviso.

Approval.

Conditions for maintenance, etc.

Limitation.

Approved, May 19, 1910.

May 21, 1910. [S. 7763.]

[Public, No. 186.]

CHAP. 252.—An Act To authorize the Pensacola and Southwestern Railroad Company, a corporation existing under the laws of the State of Alabama, to construct a bridge over and across Perdido Bay from Cummings Point, Escambia County, Florida, to Lillian, Baldwin County, Alabama.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Pensacola and Southwestern Railroad Company, a corporation existing under the laws of the State of Alabama, be, and hereby is, authorized to construct, operate, and maintain a bridge and approaches thereto across Perdido Bay, at a point suitable to the interests of navigation, from Cummings Point, on the eastern shore thereof, in the county of Escambia and State of Florida, to the town of Lillian, on the western shore thereof, in the county of Baldwin and State of Alabama, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Perdido Bay. Pensacola and Southwestern Railroad Company may bridge, Cummings Point, Fla., to Lillian, Ala.

Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, May 21, 1910.

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CHAP. 253.—An Act Authorizing the construction of a bridge across the Columbia River near the mouth of the San Poil River, in the counties of Ferry and Lincoln, Washington.

May 21, 1910. [S. 7916.]

[Public, No. 187.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Spokane and British Columbia Railway Company, a corporation organized under the laws of the State of Washington, its successors and assigns, is hereby authorized to construct, maintain, and operate a bridge and approaches thereto across the Columbia River, between the counties of Lincoln and Ferry, at a point on said river suitable to the interests of navigation at or near a point known as "Hell Gate" and near the mouth of the San Poil River in the State of Washington, in accordance with the provisions of an Act of Congress entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Columbia River. Spokane and British Columbia Railway Company may bridge, at Hell Gate.

Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, May 21, 1910.

CHAP. 263.—An Act To regulate the height of buildings in the District of Columbia.

June 1, 1910. [H. R. 19070.]

[Public, No. 196.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That from and after the date of the approval of this Act no combustible or nonfireproof building in the District of Columbia used or occupied or intended to be used or occupied as a dwelling, flat, apartment house, tenement, lodging or boarding house, hospital, dormitory, or for any similar purpose shall be erected, altered, or raised to a height of more than four stories, or more than fifty feet in height above the sidewalk, and no combustible or nonfireproof building shall be converted to any of the uses aforesaid if it exceeds either of said limits of height.

District of Columbia. Height of nonfire proof dwellings, etc., limited.

SEC. 2. That from and after the date of the approval of this Act no combustible or nonfireproof building in the District of Columbia used or occupied or intended to be used or occupied for business purposes only shall be erected, altered, or raised to a height of more than sixty feet above the sidewalk, and no combustible or nonfireproof building shall be converted to such use if it exceeds said height.

Business buildings.

SEC. 3. That all buildings in the District of Columbia, including buildings of every kind, class, and description whatsoever, excepting churches only, hereafter erected, altered, or raised in any manner as to exceed sixty feet in height shall be fireproof or noncombustible and of such fire-resisting materials, from the foundation up, as are now or at the time of the erecting, altering, or raising

Fireproof materials required for buildings exceeding 60 feet. Churches excepted.

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may be required by the building regulations of the District of Columbia.

Hotels, etc. Hotels, apartment houses, and tenement houses hereafter erected, altered, or raised in any manner so as to be three stories in height or over and buildings hereafter converted to such uses shall be of fireproof construction up to and including the main floor, and there shall be no space on any floor of such structure of an area greater than two thousand five hundred square feet that is not completely inclosed by fireproof walls, and all doors through such walls shall be of noncombustible materials.

Halls. Every building hereafter erected with a hall or altered so as to have a hall with a seating capacity of more than three hundred persons when computed, as provided by the

Churches. building regulations, and every church hereafter erected or building hereafter converted for use as a church, with such seating capacity, shall be of fireproof construction up to and including the floor of such hall or the auditorium of such church as the case may be.

Additions. SEC. 4. That additions to existing combustible or nonfireproof structures hereafter erected, altered, or raised to exceed the height limited by this Act for such structures shall be of fireproof construction from the foundation up, and no part of any combustible or nonfireproof building shall be raised above such limit or height unless that part be fireproof from the foundations up.

Towers, spires, and domes. Towers, spires, or domes, hereafter constructed more than sixty feet above the sidewalk, must be of fireproof material from the foundation up, and must be separated from the roof space, choir loft, or balcony by brick walls without openings, unless such openings are protected by fireproof or metal-covered doors on each face of the wall.

Dome in square 345. That full power and authority is hereby granted to and conferred upon every person, whose application was filed in the office of the Commissioners of the District of Columbia prior to the adoption of the present building regulations of said District, to construct a steel fireproof dome on any buildings owned by such person, in square three hundred and forty-five of said District, as set forth in the plans and specifications annexed to or forming a part of such applications so filed, any other provision in this Act

Plans. contained to the contrary notwithstanding. And the inspector of buildings of said District shall make no changes in said plans and specifications unless for the structural safety of the building it is necessary to do so.

Theaters. Every theater hereafter erected and every building hereafter converted to use as a theater, and any building or the part or parts thereof under or over the theater so erected or the buildings so converted, shall be of fireproof construction from the foundation up and have fireproof walls between it and other buildings connected therewith, and any theater damaged to one-half its value shall not be rebuilt except with fireproof materials throughout and

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otherwise in accordance with the building regulations of the District of Columbia.

Width of street to govern height.

SEC. 5. That no building shall be erected, altered, or raised in the District of Columbia in any manner so as to exceed in height above the sidewalk the width of the street, avenue, or highway in its front, increased by twenty feet; but where a building or proposed building confronts a public space or reservation formed at the intersection of two or more streets, avenues, or highways, the course of which is not interrupted by said public space or reservation, the limit of height of the building shall be determined from the width of the widest street, avenue, or highway. Where a building is to be erected or removed from all points within the boundary lines of its own lots, as recorded, by a distance at least equal to its proposed height above grade the limits of height for fireproof or noncombustible buildings in residence sections shall control, the measurements to be taken from the natural grades at the buildings as determined by the commissioners.

Business streets.

No building shall be erected, altered, or raised in any manner as to exceed the height of one hundred and thirty feet on a business street or avenue as the same is now or hereafter may be lawfully designated, except on the north side of Pennsylvania avenue between First and Fifteenth streets, northwest, where an extreme height of one hundred and sixty feet will be permitted.

Residence streets.

On a residence street, avenue, or highway no building shall be erected, altered, or raised in any manner so as to be over eighty feet in height to the top of the highest ceiling joists or over eighty-five feet in height at the highest part of the roof or parapet, nor shall the highest part of the roof or parapet exceed in height the width of the street, avenue, or highway upon which it abuts, diminished by ten feet, except on a street, avenue, or highway sixty to sixty-five feet wide, where a height of sixty feet may be allowed; and on a street, avenue, or highway sixty feet wide or less, where a height equal to the width of the street may be allowed.

Corner lots.

The height of a building on a corner lot will be determined by the width of the wider street.

Streets less than 90 feet wide.

On streets less than ninety feet wide where building lines have been established and recorded in the office of the surveyor of the district, and so as to prevent the lawful erection of a building in advance of said line, the width of the street, in so far as it controls the height of buildings under this law, shall be held to be the distance between said building lines.

Adjoining public buildings.

On blocks immediately adjacent to public buildings or to the side of any public building for which plans have been prepared and money appropriated at the time of the application for the permit to construct said building, the maximum height shall be regulated by a schedule adopted by the Commissioners of the District of Columbia.

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Abutting Union Station plaza. Vol. 32, p. 913.

Buildings hereafter erected to front or abut on the plaza in front of the new Union Station provided for by Act of Congress approved February twenty-eighth, nineteen hundred and three, shall be fireproof and shall not be of a greater height than eighty feet.

Towers, chimneys, sprinkler tanks, etc.

Spires, towers, domes, binarets, pinnacles, pent houses over elevator shafts, ventilation shafts, chimneys, smokestacks, and fire sprinkler tanks may be erected to a greater height than any limit prescribed in this Act when and as the same may be approved by the Commissioners of the District of Columbia: *Provided, however*, That such structures when above such limit of height shall be fireproof, and no floor or compartment thereof shall be constructed or used for human occupancy above the top story of the building upon which such structures are placed: *And provided*, That pent houses, ventilation shafts, and tanks shall be set back from the exterior walls distances equal to their respective heights above the adjacent roof.

Provisos. Fireproof requirements.

Distance from exterior walls.

Limit for frame dwellings.

SEC. 6. That no wooden or frame building hereafter erected, altered, or converted for use as a human habitation shall exceed three stories or exceed forty feet in height to the roof.

Basis of measurement.

SEC. 7. That for the purposes of this Act the height of buildings shall be measured from the level of the sidewalk opposite the middle of the front of the building to the highest point of the roof. If the building has more than one front, the height shall be measured from the elevation of the sidewalk opposite the middle of the front that will permit of the greater height. No parapet walls shall extend above the limit of height.

Violations declared nuisances.

SEC. 8. That buildings erected, altered, or raised or converted in violation of any of the provisions of this Act are hereby declared to be common nuisances; and the owner or the person in charge of or maintaining any such buildings, upon conviction on information filed in the police court of the District of Columbia by the corporation counsel or any of his assistants in the name of said District, and which said court is hereby authorized to hear and determine such cases, shall be adjudged guilty of maintaining a common nuisance, and shall be punished by a fine of not less than ten dollars nor more than one hundred dollars per day for each and every day such nuisance shall be permitted to continue, and shall be required by said court to abate such nuisance. The corporation counsel of the District of Columbia may maintain an action in the supreme court of the District of Columbia, in the name of the District of Columbia, to abate and perpetually enjoin such nuisance. The injunction shall be granted at the commencement of the action, and no bond shall be required. Any person violating the terms of any injunction granted in such proceeding shall be punished as for contempt by a fine of not less than one hundred nor more than five hundred dollars, or by im-

Penalty.

Injunction proceedings.

Punishment for violating injunction.

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prisonment in the United States jail for not less than thirty days nor more than six months, or by both such fine and imprisonment, in the discretion of the court.

Repeal, etc. Vol. 30, p. 923.

SEC. 9. That Congress reserves the right to alter, amend, or repeal this Act. All laws in conflict herewith are hereby repealed.

Approved, June 1, 1910.

June 9, 1910. [S. 7359.] [Public, No. 201.]

CHAP. 268.—An Act To amend laws for preventing collisions of vessels and to regulate equipment of certain motor boats on the navigable waters of the United States.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the words "motor boat" where used in this Act shall include every vessel propelled by machinery and not more than sixty-five feet in length except tug boats and tow boats propelled by steam. The length shall be measured from end to end over the deck, excluding sheer: *Provided*, That the engine, boiler, or other operating machinery shall be subject to inspection by the local inspectors of steam vessels, and to their approval of the design thereof, on all said motor boats, which are more than forty feet in length, and which are propelled by machinery driven by steam.

Motor boats. Vessels included.

Proviso. Inspection.

SEC. 2. That motor boats subject to the provisions of this Act shall be divided into classes as follows:

Classification.

Class one. Less than twenty-six feet in length.

Class two. Twenty-six feet or over and less than forty feet in length.

Class three. Forty feet or over and not more than sixty-five feet in length.

SEC. 3. That every motor boat in all weathers from sunset to sunrise shall carry the following lights, and during such time no other lights which may be mistaken for those prescribed shall be exhibited.

Lights required.

(a) Every motor boat of class one shall carry the following lights:

Class 1.

First. A white light aft to show all around the horizon.

Second. A combined lantern in the fore part of the vessel and lower than the white light aft showing green to starboard and red to port, so fixed as to throw the light from right ahead to two points abaft the beam on their respective sides.

(b) Every motor boat of classes two and three shall carry the following lights:

Classes 2 and 3.

First. A bright white light in the fore part of the vessel as near the stem as practicable, so constructed as to show an unbroken light over an arc of the horizon of twenty points of the compass, so fixed as to throw the light ten points on each side of the vessel, namely, from right ahead to two points abaft the beam on either side.

Fore.

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The glass or lens shall be of not less than the following dimensions:

Class two. Nineteen square inches.

Class three. Thirty-one square inches.

Aft. Second. A white light aft to show all around the horizon.

Side. Third. On the starboard side a green light so constructed as to show an unbroken light over an arc of the horizon of ten points of the compass, so fixed as to throw the light from right ahead to two points abaft the beam on the starboard side. On the port side a red light so constructed as to show an unbroken light over an arc of the horizon of ten points of the compass, so fixed as to throw the light from right ahead to two points abaft the beam on the port side. The glasses or lenses in the said side lights shall be of not less than the following dimensions on motor boats of—

Class two. Sixteen square inches.

Class three. Twenty-five square inches.

On and after July first, nineteen hundred and eleven, all glasses or lenses prescribed by paragraph (b) of section three shall be fresnel or fluted. The said lights shall be fitted with inboard screens of sufficient height and so set as to prevent these lights from being seen across the bow and shall be of not less than the following dimensions on motor boats of—

Class two. Eighteen inches long.

Proviso. When under sail. Class three. Twenty-four inches long: *Provided*, That motor boats as defined in this Act, when propelled by sail and machinery or under sail alone, shall carry the colored lights suitably screened but not the white lights prescribed by this section.

Sound signals. SEC. 4. (a) Every motor boat under the provisions of this Act shall be provided with a whistle or other sound-producing mechanical appliance capable of producing a blast of two seconds or more in duration, and in the case of such boats so provided a blast of at least two seconds shall be deemed a prolonged blast within the meaning of the law.

(b) Every motor boat of class two or three shall carry an efficient fog horn.

(c) Every motor boat of class two or three shall be provided with an efficient bell, which shall be not less than eight inches across the mouth on board of vessels of class three.

Life-preservers. SEC. 5. That every motor boat subject to any of the provisions of this Act, and also all vessels propelled by machinery other than by steam more than sixty-five feet in length, shall carry either life-preservers or life belts, or buoyant cushions, or ring buoys or other device, to be prescribed by the Secretary of Commerce and Labor, sufficient to sustain afloat every person on board and so placed as to be readily accessible. All motor boats carrying passengers for hire shall carry one life-preserver of

Boats carrying passengers for hire.

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the sort prescribed by the regulations of the board of supervising inspectors for every passenger carried, and no such boat while so carrying passengers for hire shall be operated or navigated except in charge of a person duly licensed for such service by the local board of inspectors. No examination shall be required as the condition of obtaining such a license, and any such license shall be revoked or suspended by the local board of inspectors for misconduct, gross negligence, recklessness in navigation, intemperance, or violation of law on the part of the holder, and if revoked the person holding such license shall be incapable of obtaining another such license for one year from the date of revocation: *Provided*, That motor boats shall not be required to carry licensed officers, except as required in this Act.

Licensed navigator.

Proviso. Other officers.

SEC. 6. That every motor boat and also every vessel propelled by machinery other than by steam, more than sixty-five feet in length, shall carry ready for immediate use the means of promptly and effectually extinguishing burning gasoline.

Extinguishing gasoline.

SEC. 7. That a fine not exceeding one hundred dollars may be imposed for any violation of this Act. The motor boat shall be liable for the said penalty and may be seized and proceeded against, by way of libel, in the district court of the United States for any district within which such vessel may be found.

Penalty.

SEC. 8. That the Secretary of Commerce and Labor shall make such regulations as may be necessary to secure the proper execution of this Act by collectors of customs and other officers of the Government. And the Secretary of the Department of Commerce and Labor may, upon application therefor, remit or mitigate any fine, penalty, or forfeiture relating to motor boats except for failure to observe the provisions of section six of this Act.

Regulations.

SEC. 9. That all laws and parts of laws only in so far as they are in conflict herewith are hereby repealed: *Provided*, That nothing in this Act shall be deemed to alter or amend Acts of Congress embodying or revising international rules for preventing collisions at sea.

Conflicting laws repealed.

Proviso. International rules not affected.

SEC. 10. That this Act shall take effect on and after thirty days after its approval.

In effect in 30 days.

Approved, June 9, 1910.

CHAP. 278.—An Act To authorize the construction of a bridge across the Mississippi River between Moline, Illinois, and Bettendorf, Iowa.

June 9, 1910.
[H. R. 18285.]
[Public, No. 203.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Moline-Bettendorf Bridge Company, a corporation organized under the laws of the State of Illinois, is hereby authorized to construct, maintain, and operate a bridge and approaches thereto, across the Missis-

Mississippi River.
Moline-Bettendorf Bridge Company may bridge, Moline, Ill., to Bettendorf, Iowa.

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sippi River from a point suitable to the interests of navigation, at or near the north end of Twenty-third street, in the city of Moline, in the county of Rock Island, in the State of Illinois, to the town of Bettendorf, Iowa, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, June 9, 1910.

June 11, 1910. [H. R. 20870.]

[Public, No. 207.]

CHAP. 285.—An Act Authorizing the widening of First street northeast in the District of Columbia.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That under and in accordance with the provisions of subchapter one of chapter fifteen of the Code of Law for the District of Columbia, within six months after the passage of this Act, the Commissioners of the District of Columbia be, and they are hereby, authorized and directed to institute in the supreme court of the District of Columbia a proceeding in rem to condemn the land that may be necessary for the widening of First street northeast along the eastern boundaries of squares numbered six hundred and seventy-five, six hundred and seventy-six, and six hundred and seventy-seven to a width of sixty feet, as shown on plans on file in the office of the engineer commissioner, District of Columbia: *Provided, however*, That the entire amount found to be due and awarded by the jury in said proceeding as damages for and in respect of the land to be condemned for said widening, plus the costs and expenses of the proceeding, shall be assessed by the jury as benefits against the several lots or parcels of land benefited, in proportion to the benefits conferred on them respectively.

District of Columbia.
First street northeast.
Condemning land to widen.
Vol. 34, p. 151.
Proviso.
Damages assessed as benefits.

SEC. 2. That there is hereby appropriated, out of the revenues of the District of Columbia, an amount sufficient to pay the necessary costs and expenses of the said condemnation proceedings taken pursuant hereto and for the payment of the amounts awarded as damages, to be repaid to the District of Columbia from the assessments for benefits and covered into the Treasury to the credit of the revenues of the District of Columbia.

Appropriation for expenses.
Payment of awards.

Approved, June 11, 1910.

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CHAP. 292.—An Act To authorize the Gary Land Company to construct two bridges across the Grand Calumet River in the State of Indiana.

June 16, 1910.
[H. R. 23480.]
[Public, No. 212.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Gary Land Company, a corporation organized under the laws of the State of Indiana, is hereby authorized to construct, maintain, and operate two bridges and approaches thereto across the Grand Calumet River at points suitable to the interests of navigation, the first bridge at a point approximately near the north line of the northwest quarter of section five, township thirty-six north, range eight west of the second principal meridian, in Lake County, in the State of Indiana; the second bridge in the southwest quarter of section thirty-three, township thirty-seven north, range eight west of the second principal meridian, in Lake County, in the State of Indiana; said bridges to be built across the Grand Calumet River in accordance with the provisions of an Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Grand Calumet River.
Gary Land Company may bridge, Lake County, Ind.

Location.

Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is expressly reserved.

Approved, June 16, 1910.

CHAP. 297.—An Act Making appropriations for the legislative, executive, and judicial expenses of the Government for the fiscal year ending June thirtieth, nineteen hundred and eleven, and for other purposes.

June 17, 1910.
[H. R. 22648.]
[Public, No. 213.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums be, and the same are hereby, appropriated, out of any money in the Treasury not otherwise appropriated, in full compensation for the service of the fiscal year ending June thirtieth, nineteen hundred and eleven, for the objects hereinafter expressed, namely:

Legislative, executive, and judicial expenses appropriations.

* * * * *

WAR DEPARTMENT.

War Department.

* * * * *

OFFICE OF THE CHIEF OF ENGINEERS: Chief clerk, two thousand dollars; two chiefs of division, at two thousand dollars each; eight clerks of class four; eleven clerks of class three; twelve clerks of class two; fifteen clerks of class one; nine clerks, at one thousand dollars each; eleven clerks, at nine hundred dollars each; six messengers; three assistant messengers; and two laborers; in

Engineer Office.

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all, one hundred thousand two hundred and twenty dollars.

Skilled draftsmen, etc.

And the services of skilled draftsmen, civil engineers, and such other services as the Secretary of War may deem necessary, may be employed only in the office of the Chief of Engineers, to carry into effect the various appropriations for rivers and harbors, fortifications, and surveys, to be paid from such appropriations: *Provided*, That the expenditures on this account under this authorization for the fiscal year ending from the date of approval of this Act to June thirtieth, nineteen hundred and eleven, shall not exceed forty-two thousand dollars; and the Secretary of War shall each year, in the annual estimates, report to Congress the number of persons so employed, their duties, and the amount paid to each.

Proviso. Limit, etc.

Authority to employ special assistants repealed. Vol. 35, p. 886.

That section fourteen of the "Act to provide for the repair, maintenance, and preservation of public works on rivers and harbors, and for other purposes," approved March third, nineteen hundred and nine, is hereby repealed.

* * * * *

Public buildings and grounds.

PUBLIC BUILDINGS AND GROUNDS.

Engineer, clerks, etc.

OFFICE OF PUBLIC BUILDINGS AND GROUNDS: Assistant engineer, two thousand four hundred dollars; assistant and chief clerk, two thousand four hundred dollars; clerk of class four; clerk of class three; clerk and stenographer, one thousand four hundred dollars; messenger; landscape architect, two thousand four hundred dollars; surveyor and draftsman, one thousand five hundred dollars; in all, fourteen thousand three hundred and forty dollars.

Foremen, etc.

For foremen, gardeners, mechanics, and laborers employed in the public grounds, thirty-one thousand two hundred dollars.

Watchmen.

For one sergeant of park watchmen, nine hundred and fifty dollars.

For second sergeant of park watchmen, nine hundred dollars.

Day force.

For day watchmen, as follows: One in Franklin Park and adjacent reservations on New York avenue; one in Lafayette Park; two in Smithsonian Grounds and neighboring reservations; one in Judiciary Park; one in Lincoln Park and adjacent reservations; one in Iowa Circle and reservations to the northwest; one in Thomas and Scott circles and neighboring reservations; one in Washington Circle and neighboring reservations; one in Dupont Circle and neighboring reservations; one in McPherson Park and Farragut Square; one in Stanton Park and neighboring reservations; two in Henry and Seaton parks and neighboring reservations; one in Mount Vernon Park and reservations to the northeast; one in grounds south of the Executive Mansion; one in Garfield and Marion parks and

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reservations to the east; one in Monument Park; and three in Potomac Park; twenty-one in all, at seven hundred and twenty dollars each, fifteen thousand one hundred and twenty dollars.

Night force.

For night watchmen, as follows: Two in Smithsonian Grounds and neighboring reservations; one in Judiciary Park; two in Henry and Seaton parks and adjacent reservations; one in grounds south of the Executive Mansion; one in Monument Park; one in Garfield Park and neighboring reservations; one in Iowa, Scott, and Thomas circles and neighboring reservations; one in Stanton and Lincoln parks and neighboring reservations; one in Lafayette and McPherson squares and Franklin and Farragut parks; one in Washington and Dupont circles and neighboring reservations; one in Mount Vernon Park and neighboring reservations; two for greenhouses and nursery; and four in Potomac Park; nineteen in all, at seven hundred and twenty dollars each, thirteen thousand six hundred and eighty dollars.

Wakefield, Va.

For watchmen for the care of the monument and dock at Wakefield, Virginia, the birthplace of Washington, three hundred dollars.

Contingent expenses.

For contingent and incidental expenses, including purchase of professional and scientific books and periodicals, books of reference, blank books, photographs, and maps, seven hundred dollars.

For purchase and repair of bicycles and revolvers for park watchmen and for purchase of ammunition, four hundred dollars.

Amount from District revenues.

Of the foregoing amounts appropriated under Public Buildings and Grounds, the sum of thirty-one thousand four hundred and seventy-five dollars shall be paid out of the revenues of the District of Columbia.

* * * * *

Pay of switchboard operators, assistant messengers, laborers, etc., rated.

SEC. 2. The pay of telephone-switchboard operators, assistant messengers, firemen, watchmen, laborers, and charwomen provided for in this Act, except those employed in mints and assay offices, unless otherwise specially stated, shall be as follows: For telephone-switchboard operators, assistant messengers, firemen, and watchmen, at the rate of seven hundred and twenty dollars per annum each; for laborers, at the rate of six hundred and sixty dollars per annum each; assistant telephone-switchboard operators, at the rate of six hundred dollars each; and for charwomen, at the rate of two hundred and forty dollars per annum each.

No pay to permanently incapacitated persons.

SEC. 3. The appropriations herein made for the officers, clerks, and persons employed in the public service shall not be available for the compensation of any persons incapacitated otherwise than temporarily for performing such service, and the heads of departments shall cause this provision to be enforced.

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Supplies for executive departments.
Contracts to be made by Secretary of the Treasury.

SEC. 4. That hereafter all supplies of fuel, ice, stationery, and other miscellaneous supplies for the executive departments and other government establishments in Washington, when the public exigencies do not require the immediate delivery of the article, shall be advertised and contracted for by the Secretary of the Treasury, instead of by the several departments and establishments, upon such days as he may designate. There shall be a general supply committee in lieu of the board provided for in section thirty-seven hundred and nine of the Revised Statutes as amended, composed of officers, one from each such department, designated by the head thereof, the duties of which committee shall be to make, under the direction of the said Secretary, an annual schedule of required miscellaneous supplies, to standardize such supplies, eliminating all unnecessary grades and varieties, and to aid said Secretary in soliciting bids based upon formulas and specifications drawn up by such experts in the service of the Government as the committee may see fit to call upon, who shall render whatever assistance they may require. The committee shall aid said Secretary in securing the proper fulfillment of the contracts for such supplies, for which purpose the said Secretary shall prescribe, and all departments comply with, rules providing for such examination and tests of the articles received as may be necessary for such purpose; in making additions to the said schedule; in opening and considering the bids, and shall perform such other similar duties as he may assign to them: *Provided*, That the articles intended to be purchased in this manner are those in common use by or suitable to the ordinary needs of two or more such departments or establishments; but the said Secretary shall have discretion to amend the annual common supply schedule from time to time as to any articles that, in his judgment, can as well be thus purchased. In all cases only one bond for the proper performance of each contract shall be required, notwithstanding that supplies for more than one department or government establishment are included in such contract. Every purchase or drawing of such supplies from the contractor shall be immediately reported to said committee. No disbursing officer shall be a member of such committee. No department or establishment shall purchase or draw supplies from the common schedule through more than one office or bureau, except in case of detached bureaus or offices having field or outlying service, which may purchase directly from the contractor with the permission of the head of their department: *And provided further*, That telephone service, electric light, and power service purchased or contracted for from companies or individuals shall be so obtained by him.

General supply committee created.
R. S., sec. 3709, p. 733.
Duties of.
Provisos. Limitation.
Bonds of contractors.
Report of supplies taken.
Disbursing officers. Limitation.
Telephone and electric service.

Inconsistent laws repealed.

SEC. 5. That all laws or parts of laws inconsistent with this Act are repealed.

Approved, June 17, 1910.

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CHAP. 300.—An Act Granting permission to the city and county of San Francisco, California, to operate a pumping station on the Fort Mason Military Reservation, in California.

June 17, 1910.
[H. R. 24728.]
[Public, No. 216.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of the United States is hereby given to the city of San Francisco, a municipal corporation existing under the laws of the State of California, to locate, construct, maintain, and operate a pumping station with accessory equipment upon the property of the United States at Fort Mason, in the State of California, upon the approval of the Secretary of War as to the location of the works and the design and character of the construction and under such terms, conditions, and regulations as may from time to time be prescribed by him regarding the use of the reservation for this purpose and the operation and maintenance of the plant.

San Francisco, Cal.
May operate pumping station, Fort Mason Reservation, Cal.

Approved, June 17, 1910.

CHAP. 301.—An Act To authorize additional aids to navigation in the Light-House Establishment, and to provide for a Bureau of Light-Houses in the Department of Commerce and Labor, and for other purposes.

June 17, 1910.
[H. R. 24877.]
[Public, No. 217.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of Commerce and Labor be, and he is hereby, authorized to establish and provide the following additional aids to navigation in the Light-House Establishment, under the Department of Commerce and Labor, in accordance with the respective limits of cost hereinafter respectively set forth, which shall in no case be exceeded.

Aids to navigation.

* * * * *

SEC. 5. That all employees of or in the Light-House Board or the Light-House Establishment are hereby transferred to the bureau of light-houses, excepting, however, army and navy officers.

Employees transferred.

* * * * *

SEC. 11. That the commissioner of light-houses, subject to the approval of the Secretary of Commerce and Labor, as soon as practicable, shall rearrange the ocean, gulf, and lake coasts and the rivers of the United States, Porto Rico, and the naval station in Cuba into not exceeding nineteen light-house districts, and a light-house inspector shall be assigned in charge of each district. The light-house inspectors shall each receive a salary of two thousand four hundred dollars per annum, except the inspector of the third district, whose salary shall be three

Light-house districts.
Rearrangement.
Inspectors.
Salaries.

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Temporary assignment of Army and Navy officers.

thousand six hundred dollars per annum. The President may, for a period not exceeding three years from the taking effect of this section, assign army and navy officers to act in lieu of the appointment of civilian light-house inspectors, but such army and navy officers shall not receive any salary or compensation in addition to the salary or compensation they are entitled to as such army or navy officers: *Provided*, That in the districts which include the Mississippi River and its tributaries the President may designate army engineers to perform the duties of and act as inspectors. The President may detail officers of the Engineer Corps of the United States Army for consultation or to superintend the construction or repair of any aid to navigation authorized by Congress.

Proviso. Engineer officer for Mississippi River districts. Detail for construction, etc.

* * * * *

In effect July 1.

SEC. 14. That sections four to thirteen, inclusive, of this Act, shall take effect on the first day of July next succeeding its passage.

Approved, June 17, 1910.

June 22, 1910. [H. R. 19039.]

CHAP. 319.—An Act Authorizing the extension of Massachusetts avenue northwest from Wisconsin avenue to the District line.

[Public, No. 228.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That, under and in accordance with the provisions of subchapter one of chapter fifteen of the Code of Law for the District of Columbia, the Commissioners of the District of Columbia be, and they are hereby, authorized and directed to institute in the supreme court of the District of Columbia a proceeding in rem to condemn the land that may be necessary for the extension and widening of Massachusetts avenue northwest from Wisconsin avenue to the District line, with a width of one hundred and sixty feet: *Provided*, *however*, That the entire amount found to be due and awarded by the jury in said proceeding as damages for and in respect of the land to be condemned for said extension plus the costs and expenses of the proceeding hereunder shall be assessed by the jury as benefits.

District of Columbia. Massachusetts avenue northwest. Condemning land for extending, etc. Vol. 34, p. 151. *Proviso.* Damages assessed as benefits.

Appropriation for expenses.

SEC. 2. That there is hereby appropriated out of the revenues of the District of Columbia an amount sufficient to pay the necessary costs and expenses of the condemnation proceedings herein provided for and for the payment of the amounts awarded by the jury as damages, to be repaid to the District of Columbia from the assessments for benefits and covered into the Treasury to the credit of the revenues of the District of Columbia.

Payment of awards.

Approved, June 22, 1910.

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CHAP. 322.—An Act To give a legal status to the lead of wires of the Tri-State Telephone and Telegrah Company across the Mississippi River.

June 22, 1910.
[H. R. 22690.]
[Public, No. 231.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the crossing by lead of wires of the Mississippi River between Morgans Point, Arkansas, and Richardson, Tennessee, of the Tri-State Telephone and Telegraph Company, a corporation organized under the laws of the State of Arkansas, to be used for telephone and telegraph purposes, is hereby legalized, and the consent of Congress is hereby given to its maintenance by said company, subject, however, to all the provisions of the statutes now or hereafter in force relating to the preservation and protection of navigable waters: *Provided*, That any changes in the said crossing which the Secretary of War may at any time deem necessary and order in the interest of navigation shall be promptly made by the owners thereof at their own expense: *Provided further*, That within sixty days from the approval of this Act the said company shall furnish, for the files of the War Department, a drawing showing the location and plan of the cable crossing with reference to the banks, bed, and low-water surface of the river.

Mississippi River.
Tri-State Telephone and Telegraph Company may lay cable across, Morgans Point, Ark., to Richardson, Tenn.

Provisos.
Changes.

Plans, etc., to be filed.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, June 22, 1910.

CHAP. 324.—An Act To authorize the Indiana Steel Company to construct two bridges across the Grand Calumet River in the State of Indiana.

June 22, 1910.
[H. R. 23427.]
[Public, No. 233.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Indiana Steel Company, a corporation organized under the laws of the State of Indiana, is hereby authorized to construct, maintain, and operate two bridges and approaches thereto across the Grand Calumet River at points suitable to the interests of navigation, the first bridge in the northeast quarter of the northwest quarter of section three, township thirty-six north, range eight west of the second principal meridian, in Lake County, in the State of Indiana; the second bridge in the northwest quarter of the northwest quarter of section three, township thirty-six north, range eight west of the second principal meridian, in Lake County, in the State of Indiana; said bridges to be built across the Grand Calumet River in accordance with the provisions of an Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Grand Calumet River.
Indiana Steel Company may bridge, in Lake County, Ind.

Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is expressly reserved.

Amendment.

Approved, June 22, 1910.

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June 22, 1910. [H. R. 23634.]

CHAP. 325.—An Act To authorize the Rockport and Aransas Pass Railway Company to construct a bridge.

[Public, No. 234.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Rockport and Aransas Pass Railway Company, a corporation organized under the laws of the State of Texas, is hereby authorized to construct, maintain, and operate a bridge and approaches thereto on their contemplated line from Rockport to Harbor Island, across the Morris and Cummings Channel, at a point suitable to the interests of navigation, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Morris and Cummings Channel, Tex.

Rockport and Aransas Pass Railway Company may bridge.

Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expresssly reserved.

Approved, June 22, 1910.

June 22, 1910. [H. R. 23964.]

CHAP. 326.—An Act To extend the time for Clay County, Arkansas, to construct a bridge across Black River at or near Bennetts Ferry, in said county and State.

[Public, No. 235.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Act approved February sixteenth, nineteen hundred and seven, entitled "An Act to authorize the county of Clay, State of Arkansas, to construct a bridge across Black River, at or near Bennetts Ferry, in said county and State," is hereby revived and reenacted, and the time for commencing and completing the construction of the bridge therein authorized is hereby extended one year and three years, respectively, from the date of approval of this Act.

Black River. Time extended for bridging, by Clay County, Ark., at Bennetts Ferry.

Vol. 34, p. 892.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expresssly reserved.

Approved, June 22, 1910.

June 23, 1910. [H. R. 18700.]

CHAP. 359.—An Act To prevent the dumping of refuse material in Lake Michigan at or near Chicago.

[Public, No. 245.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That it shall not be lawful to throw, discharge, dump, or deposit, or cause, suffer, or procure, to be thrown, discharged, dumped, or deposited, any refuse matter of any kind or description whatever other than that flowing from streets and sewers and passing therefrom in a liquid state into Lake Michigan, at any point opposite or in front of the county of Cook, in the State of Illinois, or the county of Lake in the State of Indiana, within eight miles from the shore of said lake, unless said material shall be placed inside of a breakwater so arranged as not to permit the escape of such refuse ma-

Lake Michigan.

Dumping refuse in, near Chicago, Ill., unlawful.

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terial into the body of the lake and cause contamination thereof; and no officer of the Government shall dump or cause or authorize to be dumped any material contrary to the provisions of this Act: *Provided, however*, That the provisions of this Act shall not apply to work in connection with the construction, repair, and protection of breakwaters and other structures built in aid of navigation, or for the purpose of obtaining water supply. Any person violating any provision of this Act shall be guilty of a misdemeanor, and on conviction thereof shall be fined for each offense not exceeding one thousand dollars.

Proviso. Works excepted.

Penalty.

Approved, June 23, 1910.

CHAP. 360.—An Act To amend an Act entitled "An Act to regulate the construction of dams across navigable waters," approved June twenty-first, nineteen hundred and six.

June 23, 1910.
[H. R. 24375.]
[Public, No. 246.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Act entitled "An Act to regulate the construction of dams across navigable waters," approved June twenty-first, nineteen hundred and six, be, and the same is hereby, amended to read as follows:

Dams.
Vol. 34, p. 386, amended.

"SECTION 1. That when authority has been or may hereafter be granted by Congress, either directly or indirectly or by any official or officials of the United States, to any persons, to construct and maintain a dam for water power or other purpose across or in any of the navigable waters of the United States, such dam shall not be built or commenced until the plans and specifications for such dam and all accessory works, together with such drawings of the proposed construction and such map of the proposed location as may be required for a full understanding of the subject, have been submitted to the Secretary of War and the Chief of Engineers for their approval, nor until they shall have approved such plans and specifications and the location of such dam and accessory works; and when the plans and specifications for any dam to be constructed under the provisions of this Act have been approved by the Chief of Engineers and by the Secretary of War it shall not be lawful to deviate from such plans or specifications either before or after completion of the structure unless the modification of such plans or specifications has previously been submitted to and received the approval of the Chief of Engineers and of the Secretary of War: *Provided*, That in approving the plans, specifications, and location for any dam, such conditions and stipulations may be imposed as the Chief of Engineers and the Secretary of War may deem necessary to protect the present and future interests of the United States, which may include the condition that the persons constructing or maintaining such dam shall construct, maintain, and operate, without expense to the United States, in connection with any dam and accessory

Regulations governing constructing over navigable waters, extended.

Approval of Secretary of War and Chief of Engineers.

Changes.

Provisos. Conditions.

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or appurtenant works, a lock or locks, booms, sluices, or any other structure or structures which the Secretary of War and the Chief of Engineers or Congress at any time may deem necessary in the interests of navigation, in accordance with such plans as they may approve, and also that whenever Congress shall authorize the construction of a lock or other structures for navigation purposes in connection with such dam, the persons owning such dam shall convey to the United States, free of cost, title to such land as may be required for such constructions and approaches, and shall grant to the United States free water power or power generated from water power for building and operating such constructions: *Provided further*, That in acting upon said plans as aforesaid the Chief of Engineers and the Secretary of War shall consider the bearing of said structure upon a comprehensive plan for the improvement of the waterway over which it is to be constructed with a view to the promotion of its navigable quality and for the full development of water power; and, as a part of the conditions and stipulations imposed by them, shall provide for improving and developing navigation, and fix such charge or charges for the privilege granted as may be sufficient to restore conditions with respect to navigability as existing at the time such privilege be granted or reimburse the United States for doing the same, and for such additional or further expense as may be incurred by the United States with reference to such project, including the cost of any investigations necessary for approval of plans and of such supervision of construction as may be necessary in the interests of the United States: *Provided further*, That the Chief of Engineers and the Secretary of War are hereby authorized and directed to fix and collect just and proper charge or charges for the privilege granted to all dams authorized and constructed under the provisions of this Act which shall receive any direct benefit from the construction, operation, and maintenance by the United States of storage reservoirs at the headwaters of any navigable streams, or from the acquisition, holding, and maintenance of any forested watershed, or lands located by the United States at the headwaters of any navigable stream, wherever such shall be, for the development, improvement, or preservation of navigation in such streams in which such dams may be constructed.

Approaches, etc., to locks.

Water power.

Bearing upon improvements to be considered.

Charges for improvements, etc.

Charges for storage reservoirs, etc., constructed.

" SEC. 2. That the right is hereby reserved to the United States to construct, maintain, and operate, in connection with any dam built in accordance with the provisions of this Act, a suitable lock or locks, booms, sluices, or any other structures for navigation purposes, and at all times to control the said dam and the level of the pool caused by said dam to such an extent as may be necessary to provide proper facilities for navigation.

Rights reserved for navigation.

" SEC. 3. That the persons constructing, maintaining, or operating any dam or appurtenant or accessory works, in accordance with the provisions of this Act, shall be lia-

Flowage, etc., damages.

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ble for any damage that may be inflicted thereby upon private property, either by overflow or otherwise. The persons owning or operating any such dam, or accessory works, subject to the provisions of this Act, shall maintain, at their own expense, such lights and other signals thereon and such fishways as the Secretary of Commerce and Labor shall prescribe, and for failure so to do in any respect shall be deemed guilty of a misdemeanor and subject to a fine of not less than five hundred dollars, and each month of such failure shall constitute a separate offense and subject such persons to additional penalties therefor.

Lights, fishways, etc., to be maintained.

Penalty for failure.

"SEC. 4. That all rights acquired under this Act shall cease and be determined if the person, company, or corporation acquiring such rights shall, at any time, fail, after receiving reasonable notice thereof, to comply with any of the provisions and requirements of the Act or with any of the stipulations and conditions that may be prescribed as aforesaid by the Chief of Engineers and the Secretary of War, including the payment into the Treasury of the United States of the charges provided for by section one of this Act: *Provided*, That Congress may revoke any rights conferred in pursuance of this Act whenever it is necessary for public use, and, in the event of any such revocation by Congress, the United States shall pay the owners of any dam and appurtenant works built under authority of this Act, as full compensation, the reasonable value thereof, exclusive of the value of the authority or franchise granted, such reasonable value to be determined by mutual agreement between the Secretary of War and the said owners, and in case they can not agree, then by proceedings instituted in the United States circuit court for the condemnation of such properties: *And provided also*, That the authority granted under or in pursuance of the provisions of this Act shall terminate at the end of a period not to exceed fifty years from the date of the original approval of the project under this Act, unless sooner revoked as herein provided or Congress shall otherwise direct: *Provided, however*, That this limitation shall not apply to any corporation or individual heretofore authorized by the United States, or by any State, to construct a dam in or across a navigable waterway, upon which dam expenditures of money have heretofore been made in reliance upon such grant or grants.

Forfeiture of rights.

Provisos. Revocation when needed for public use.

Termination in fifty years.

Exceptions.

"SEC. 5. That any persons who shall fail or refuse to comply with the lawful order of the Secretary of War and the Chief of Engineers, made in accordance with the provisions of this Act, shall be deemed guilty of a violation of this Act, and any persons who shall be guilty of a violation of this Act shall be deemed guilty of a misdemeanor and on conviction thereof shall be punished by a fine not exceeding five thousand dollars, and every month such persons shall remain in default shall be deemed a new offense and subject such persons to addi-

Penalty for noncompliance with orders.

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Removal, etc.

tional penalties therefor; and in addition to the penalties above described the Secretary of War and the Chief of Engineers may, upon refusal of the persons owning or controlling any such dam and accessory works to comply with any lawful order issued by the Secretary of War or Chief of Engineers in regard thereto, cause the removal of such dam and accessory works as an obstruction to navigation at the expense of the persons owning or controlling such dam, and suit for such expense may be brought in the name of the United States against such persons and recovery had for such expense in any court of competent jurisdiction. Said provision as to recovery of expense shall not apply wherever the United States has been previously reimbursed for such removal; and the removal or any structures erected or maintained in violation of the provisions of this Act or the order or direction of the Secretary of War or the Chief of Engineers made in pursuance thereof may be enforced by injunction, mandamus, or other summary process, upon application to the circuit court in the district in which such structure may, in whole or in part, exist, and proper proceedings to this end may be instituted under the direction of the Attorney-General of the United States at the request of the Chief of Engineers or the Secretary of War; and in case of any litigation arising from any obstruction or alleged obstruction to navigation created by the construction of any dam under this Act the cause or question arising may be tried before the circuit court of the United States in any district in which any portion of said obstruction or dam touches.

Suits for expense.

Proceeding.

Litigation.

Time for construction.

"SEC. 6. That whenever Congress shall hereafter by law authorize the construction of any dam across any of the navigable waters of the United States, and no time for the commencement and completion of such dam is named in said Act, the authority thereby granted shall cease and be null and void unless the actual construction of the dam authorized in such Act be commenced within one year and completed within three years from the date of the passage of such Act.

Right to alter, etc., reserved.

"SEC. 7. That the right to alter, amend, or repeal this Act is hereby expressly reserved as to any and all dams which may be constructed in accordance with the provisions of this Act, and the United States shall incur no liability for the alteration, amendment, or repeal thereof to the owner or owners or any other persons interested in any dam which shall have been constructed in accordance with its provisions.

Construction of "persons" and "dam."

"SEC. 8. That the word 'persons' as used in this Act shall be construed to import both the singular and the plural, as the case demands, and shall include corporations, companies, and associations. The word 'dam' as used in this Act shall be construed to import both the singular and the plural, as the case demands."

Approved, June 23, 1910.

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CHAP. 361.—An Act Making appropriations for fortifications and other works of defense, for the armament thereof, for the procurement of heavy ordnance for trial and service, and for other purposes. June 23, 1910. [H. R. 17500.] [Public, No. 247.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the sums of money herein provided for be, and the same are hereby, appropriated, out of any money in the Treasury not otherwise appropriated, to be available until expended, namely: Fortifications appropriations.

FORTIFICATIONS AND OTHER WORKS OF DEFENSE.

UNDER THE ENGINEER DEPARTMENT. Engineer Department.

For construction of fire-control stations and accessories, including purchase of lands and rights of way, and for the purchase and installation of necessary lines and means of electrical communication, including telephones, dial and other telegraphs, wiring and all special instruments, apparatus, and materials, coast signal apparatus, and salaries of electrical experts, engineers, and other necessary employees connected with the use of coast artillery; for the purchase, manufacture, and test of range finders and other instruments for fire control at the fortifications, and the machinery necessary for their manufacture at the arsenals, two hundred thousand dollars. Fire-control stations. Range finders, etc.

For purchase and installation of searchlights for the defenses of our most important harbors, fifty thousand dollars. Searchlights.

For the protection, preservation, and repair of fortifications for which there may be no special appropriation available three hundred thousand dollars. Preservation, etc.

For preparation of plans for fortifications, five thousand dollars. Plans.

For tools, electrical and engine supplies and appliances, to be furnished by the Engineer Department, for the use of the troops for maintaining and operating electric light and power plants in gun and mortar batteries, forty-five thousand dollars. Electric plants.

For preservation and repair of structures erected for the torpedo defense of the United States, twenty thousand dollars. Torpedostructures.

* * * * *

FORTIFICATIONS IN INSULAR POSSESSIONS. Insular possessions.

ENGINEER DEPARTMENT. Engineer Department.

For construction of seacoast batteries, as follows: Philippine Islands.

In the Philippine Islands, eight hundred thousand dollars: *Provided*, That contracts may be entered into, under the direction of the Secretary of War, for materials and Seacoast batteries. *Proviso.* Contracts.

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work for construction of seacoast batteries in the Philippine Islands, to be paid for as appropriations may from time to time be made by law, for an additional sum not to exceed four hundred and nineteen thousand dollars.

Electric plants. For installation of light and power plants at the defenses of the following localities:

In the Philippine Islands, forty-five thousand dollars.

Searchlights. For purchase and installation of searchlights for the defenses of most important harbors, as follows:

In the Philippine Islands, one hundred and thirty-nine thousand dollars.

Preservation, etc. For protection, preservation, and repair of fortifications at the following localities:

In the Philippine Islands, seven thousand dollars.

Torpedo structures. For preservation and repair of structures erected for torpedo defense at the following localities:

In the Philippine Islands, one thousand dollars.

Operating power plants. For tools, electrical and other supplies and appliances, to be furnished by the Engineer Department for the use of the troops for maintaining and operating gun and mortar batteries—

In the Philippine Islands, two thousand five hundred dollars.

* * * * *

Materials to be of American manufacture. That all material purchased under the provisions of this Act shall be of American manufacture, except in cases when, in the judgment of the Secretary of War, it is to the manifest interest of the United States to make purchases in limited quantities abroad, which material shall be admitted free of duty.

* * * * *

Board of Ordnance and Fortification. BOARD OF ORDNANCE AND FORTIFICATION.

Purchases, etc. To enable the board to make all needful and proper purchases, experiments, and tests to ascertain, with a view to their utilization by the Government, the most effective guns, small arms, cartridges, projectiles, fuses, explosives, torpedoes, armor plates, and other implements and engines of war, and to purchase or cause to be manufactured, under authority of the Secretary of War, such guns, carriages, armor plates, and other war material as may, in the judgment of the board, be necessary in the proper discharge of the duty devolved upon it by the Act approved September twenty-second, eighteen hundred and eighty-eight; to pay the salary of the civilian member of the Board of Ordnance and Fortification provided by the Act of February twenty-fourth, eighteen hundred and ninety-one, and for the necessary traveling expenses of said member when traveling on duty as contemplated in said Act; for the payment of the necessary expenses of the board, including a per diem allowance to each officer detailed to serve thereon, when employed on duty away

Vol. 25, p. 489.

Civilian member. Salary.

Vol. 26, p. 769.

Per diem, etc.

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from his permanent station, of two dollars and fifty cents a day; and for the test of experimental guns, carriages, and other devices procured in accordance with the recommendation of the Board of Ordnance and Fortification, twenty-five thousand dollars, the expenditure of which shall be made by the several bureaus of the War Department heretofore having jurisdiction of the same, or by the board itself, as the Secretary of War may direct: *Provided*, That before any money shall be expended in the construction or test of any gun, gun carriage, ammunition, or implements under the supervision of the said board, the board shall be satisfied, after due inquiry, that the Government of the United States has a lawful right to use the inventions involved in the construction of such gun, gun carriage, ammunition, or implements, or that the construction or test is made at the request of a person either having such lawful right or authorized to convey the same to the Government.

Proviso. Right to use inventions.

Approved, June 23, 1910.

June 23, 1910. [S. 8222.] [Public, No. 249.]

CHAP. 363.—An Act Granting to the Northern Pacific Railway Company the right to construct and maintain a bridge across the Yellowstone River.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Northern Pacific Railway Company, or any railway corporation controlled by it, be, and is hereby, authorized to construct and maintain a railroad bridge and approaches thereto across the Yellowstone River in section thirty-four, township sixteen north, range fifty-five east, in the county of Dawson, State of Montana, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six: *Provided*, That the location and plans of the said bridge may be approved by the Secretary of War and Chief of Engineers, and if built in accordance therewith the bridge shall be a lawful structure, notwithstanding actual construction was commenced before the passage of this Act.

Yellowstone River. Northern Pacific Railway Company may bridge, Dawson County, Mont.

Vol. 34, p. 84.

Proviso. Approval by Secretary of War.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, June 23, 1910.

June 23, 1910. [S. 8316.] [Public, No. 250.]

CHAP. 364.—An Act Authorizing the construction of a bridge across the Columbia River between the counties of Grant and Kittitas, in the State of Washington.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Northern Pacific Railway Company, or

Columbia River.

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Northern Pacific Railway Company may bridge, between Grant and Kittitas counties, Wash.

any railway corporation controlled by it, is hereby authorized to construct, maintain, and operate a bridge and approaches thereto across the Columbia River between the counties of Grant and Kittitas, in the State of Washington, at a point, suitable to the interests of navigation, in section twenty, township seventeen north, range twenty-three east, in accordance with the provisions of an Act of Congress entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, June 23, 1910.

June 23, 1910. [S. 8425.]

[Public, No. 251.]

CHAP. 365.—An Act To authorize the Saint Louis-Kansas City Electric Railway Company to construct a bridge across the Missouri River at or near the town of Saint Charles, Missouri.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Saint Louis-Kansas City Electric Railway Company, a corporation organized under the laws of the State of Missouri, is hereby authorized to construct, maintain, and operate a bridge and approaches thereto across the Missouri River at a point suitable to the interests of navigation at or near the town of Saint Charles, in the State of Missouri, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Missouri River.

Saint Louis-Kansas City Electric Railway Company may bridge, Saint Charles, Mo.

Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, June 23, 1910.

June 23, 1910. [S. 8426.]

[Public, No. 252.]

CHAP. 366.—An Act To authorize the Saint Louis-Kansas City Electric Railway Company to construct a bridge across the Missouri River at or near the town of Arrow Rock, Missouri.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Saint Louis-Kansas City Electric Railway Company, a corporation organized under the laws of the State of Missouri, is hereby authorized to construct, maintain, and operate a bridge and approaches thereto across the Missouri River at a point suitable to the interests of navigation at or near the town of Arrow Rock, in the State of Missouri, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Missouri River.

Saint Louis-Kansas City Electric Railway Company may bridge, Arrow Rock, Mo.

Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, June 23, 1910.

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CHAP. 367.—An Act To authorize the Southern Development Company to construct a bridge across the Arkansas River.

June 23, 1910. [S. 8615.]

[Public, No. 253.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Southern Development Company, a corporation organized and existing under and by virtue of the laws of the State of Colorado and duly authorized to transact business in the State of Arkansas, is hereby authorized to construct, maintain, and operate a bridge and approaches thereto across the Arkansas River, at a point suitable to the interests of navigation, at or near Pine Bluff, in the county of Jefferson and State of Arkansas, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Arkansas River. Southern Development Company may bridge, Pine Bluff, Ark.

Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, June 23, 1910.

CHAP. 368.—An Act To authorize the Stockton Terminal and Eastern Railroad Company, a corporation organized under the laws of the State of California, to construct a bridge across the Stockton diverting canal, connecting Mormon Channel with the Calaveras River, in the county of San Joaquin, State of California.

June 23, 1910. [S. 8697.]

[Public, No. 254.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Stockton Terminal and Eastern Railroad Company, a corporation organized under the laws of the State of California, is hereby authorized to construct, maintain, and operate a bridge and approaches thereto, across the Stockton diverting canal, connecting Mormon Channel with Calaveras River, at a point suitable to the interests of navigation in the county of San Joaquin in the State of California, in accordance with the provisions of the Act entitled 'An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Stockton Canal. Stockton Terminal and Eastern Railroad Company may bridge, in San Joaquin County, Cal.

Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, June 23, 1910.

CHAP. 373.—An Act Relating to liens on vessels for repairs, supplies, or other necessaries.

June 23, 1910. [H. R. 15812.]

[Public, No. 259.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That any person furnishing repairs, supplies, or other necessaries, including the use of dry dock or marine railway, to a vessel, whether foreign or domestic, upon

Shipping. Maritime lien on vessels for repairs, supplies, etc.

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the order of the owner or owners of such vessel, or of a person by him or them authorized, shall have a maritime lien on the vessel which may be enforced by a proceeding in rem, and it shall not be necessary to allege or prove that credit was given to the vessel.

Persons presumed to have authority.

SEC. 2. That the following persons shall be presumed to have authority from the owner or owners to procure repairs, supplies, and other necessaries for the vessel: The managing owner, ship's husband, master, or any person to whom the management of the vessel at the port of supply is intrusted. No person tortiously or unlawfully in possession or charge of a vessel shall have authority to bind the vessel.

Charterers, etc.

SEC. 3. That the officers and agents of a vessel specified in section two shall be taken to include such officers and agents when appointed by a charterer, by an owner pro hac vice, or by an agreed purchaser in possession of the vessel, but nothing in this Act shall be construed to confer a lien when the furnisher knew, or by the exercise of reasonable diligence could have ascertained, that because of the terms of a charter party, agreement for sale of the vessel, or for any other reason, the person ordering the repairs, supplies, or other necessaries was without authority to bind the vessel therefor.

Waiving lien.

SEC. 4. That nothing in this Act shall be construed to prevent a furnisher of repairs, supplies, or other necessaries from waiving his right to a lien at any time, by agreement or otherwise, and this Act shall not be construed to affect the rules of law now existing, either in regard to the right to proceed against a vessel for advances, or in regard to laches in the enforcement of liens on vessels, or in regard to the priority or rank of liens, or in regard to the right to proceed in personam.

Other proceedings not affected.

State laws not superseded.

SEC. 5. That this Act shall supersede the provisions of all state statutes conferring liens on vessels in so far as the same purport to create rights of action to be enforced by proceedings in rem against vessels for repairs, supplies, and other necessaries.

Approved, June 23, 1910.

June 24, 1910. [H. R. 4738.]

CHAP. 381.—An Act For the relief of the estate of James Allender, deceased.

[Private, No. 130.]

James Allender.

Payment to estate of.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of the Treasury be, and he is hereby, directed and required to pay to the personal representative of James Allender, deceased, late of Taylor County, West Virginia, out of any money in the Treasury not otherwise appropriated, the sum of two thousand three hundred and fifty dollars, and said sum of two

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thousand three hundred and fifty dollars is hereby appropriated, out of any money in the Treasury, for the water privilege and franchise to the mill property on the Monongahela River, in Monongalia County, West Virginia, lately owned by the said James Allender, and in full of all damage to said mill property by reason of the improvement of the said river and the lock and dam erected thereon and constructed by the Government of the United States upon said river in improving the navigation of said river, in pursuance of an award made on the twenty-sixth day of April, eighteen hundred and seventy-three, by arbitrators mutually agreed upon by the said Allender and by the said Government of the United States and approved by the Chief of Engineers.

Approved, June 24, 1910.

CHAP. 382.—An Act Making appropriations for the construction, repair, and preservation of certain public works on rivers and harbors, and for other purposes.

June 25, 1910.
[H. R. 20686.]
[Public, No. 264.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums of money be, and are hereby, appropriated, to be paid out of any money in the Treasury not otherwise appropriated, to be immediately available, and to be expended under the direction of the Secretary of War and the supervision of the Chief of Engineers, for the construction, completion, repair, and preservation of the public works hereinafter named:

Rivers and harbors appropriations.

Breakwater from Mount Desert to Porcupine Island, Bar Harbor, Maine: Continuing construction, twenty-five thousand dollars.

Bar Harbor, Me. Breakwater.

Improving harbor at Camden, Maine: Completing improvement in accordance with the report submitted in House Document Numbered Eleven hundred and seventeen, Sixtieth Congress, second session, twenty thousand dollars.

Camden, Me.

Improving harbor at East Boothbay, Maine: Completing improvement in accordance with the reports submitted in House Documents Numbered Nine hundred and forty-four, Sixtieth Congress, first session, and Six hundred and eighty-four, Sixty-first Congress, second session, six thousand five hundred dollars.

East Boothbay, Me.

Improving harbor at Matinicus, Maine: Completing improvement in accordance with the report submitted in House Document Numbered Six hundred and fifty-three, Sixtieth Congress, first session, thirteen thousand dollars.

Matinicus, Me.

Improving Pepperells Cove, Maine, in accordance with the report submitted in House Document Numbered Ten hundred and eighty-one, Sixtieth Congress, second session, sixty thousand dollars.

Pepperells Cove, Me.

Improving Harbor at Rockport, Maine: Completing improvement in accordance with the report submitted in

Rockport, Me.

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House Document Numbered Nine hundred and sixty-three, Sixtieth Congress, first session, thirty-two thousand dollars.

Stockton, Me. Improving Stockton Harbor, Maine: Completing improvement in accordance with the report submitted in House Document Numbered Eleven hundred and sixty-six, Sixtieth Congress, second session, thirty-eight thousand dollars.

Saco River, Me. Improving Saco River, Maine, in accordance with the report submitted in House Document Numbered Seven hundred and fifty-two, Sixty-first Congress, second session, thirty thousand dollars.

Saint Croix River, Me. Improving Saint Croix River, Maine, in accordance with the report submitted in House Document Numbered Seven hundred and forty-eight, Sixty-first Congress, second session, seventy-five thousand dollars: *Provided*, That the Secretary of State be, and he is hereby, authorized and directed to negotiate with the Government of Great Britain with a view to its cooperation in said improvement, and that the work shall be prosecuted on such terms as shall be mutually agreed upon by the two governments.

Proviso. Cooperation with Great Britain.

Isles of Shoals, Me., and N. H. Improving harbor at Isles of Shoals, Maine and New Hampshire: Completing improvement in accordance with the report submitted in House Document Numbered Eleven hundred and twenty-two, Sixtieth Congress, second session, forty thousand dollars.

Burlington, Vt. Improving harbor at Burlington, Vermont: Continuing improvement, fifty-two thousand dollars.

Saint Albans, Vt. Improving harbor at Saint Albans, Vermont: Completing improvement in accordance with the report submitted in House Document Numbered Eleven hundred and nine, Sixtieth Congress, second session, five thousand dollars.

Boston, Mass. Maintenance. Improving harbor at Boston, Massachusetts: For maintenance, twenty-five thousand dollars.

Fall River, Mass. Improving harbor at Fall River, Massachusetts: Completing improvement in accordance with the report submitted in House Document Numbered Seven hundred and seventy-eight, Sixty-first Congress, second session, one hundred and forty-three thousand dollars.

Gloucester, Mass. Improving harbor at Gloucester, Massachusetts, in accordance with the report submitted in House Document Numbered Eleven hundred and twelve, Sixtieth Congress, second session, twenty-five thousand dollars.

Lynn, Mass. Improving harbor at Lynn, Massachusetts: Continuing improvement in accordance with the report submitted in House Document Numbered Nine hundred and forty-eight, Sixtieth Congress, first session, sixty thousand dollars.

Nantucket, Mass. Improving harbor at Nantucket, Massachusetts: Continuing improvement and for maintenance, fifty thousand dollars.

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Improving harbors at New Bedford and Fairhaven, Massachusetts: Continuing improvement, fifty thousand dollars.

Improving harbor at Newburyport, Massachusetts: Continuing improvement in accordance with the existing project or such modification thereof, by dredging or otherwise, as, in the discretion of the Secretary of War, may be advisable with a view to securing the existing project depth of seventeen feet, fifty thousand dollars. Newburyport, Mass.

Improving harbor at Plymouth, Massachusetts: For maintenance, ten thousand dollars. Plymouth, Mass.

Improving harbor at Provincetown, Massachusetts: Completing improvement in accordance with the report submitted in House Document Numbered Eight hundred and twenty-one, Sixty-first Congress, second session, one hundred and forty thousand dollars. Provincetown, Mass.

Harbor of refuge at Sandy Bay, Cape Ann, Massachusetts: Continuing improvement, one hundred thousand dollars. Sandy Bay, Cape Ann, Mass.

Improving Merrimac River, Massachusetts: For maintenance, ten thousand dollars. Merrimac River, Mass.

Improving Mystic River, Massachusetts, below mouth of Island End River: Continuing improvement in accordance with the report submitted in House Document Numbered Ten hundred and eighty-six, Sixtieth Congress, second session, seventy-two thousand dollars. Mystic River, Mass.

Improving Taunton River, Massachusetts: For maintenance, five thousand dollars. Taunton River, Mass.

Improving Weymouth Back River, Massachusetts: For maintenance, five thousand dollars. Weymouth Back River, Mass.

Improving harbor of refuge at Block Island, Rhode Island: For maintenance, twelve thousand five hundred dollars. Block Island, R. I. Harbor of refuge.

Improving harbor at Great Salt Pond, Block Island, Rhode Island: Continuing improvement, thirty thousand dollars. Great Salt Pond.

Improving harbor at Newport, Rhode Island, in accordance with the report submitted in House Document Numbered Six hundred and ten, Sixty-first Congress, second session, fifty thousand dollars: *Provided*, That the Secretary of War may enter into a contract or contracts for such materials and work as may be necessary to complete the said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate one hundred and eighty-three thousand dollars, exclusive of the amounts herein and heretofore appropriated. Newport, R. I. *Proviso.* Contracts.

Harbor of refuge at Point Judith, Rhode Island: For maintenance and construction of the west shore arm of the breakwater, in accordance with the report submitted in House Document Numbered Nine hundred and eleven, Sixtieth Congress, first session, one hundred and seventy-five thousand dollars. Point Judith, R. I. Harbor of refuge.

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Providence River and Harbor, R. I.

Improving Providence River and Harbor, Rhode Island: For maintenance, and continuing improvement in accordance with the report submitted in House Document Numbered Nine hundred and nineteen, Sixtieth Congress, first session, fifty thousand dollars.

Improving Providence River and Harbor, Rhode Island: Continuing improvement in accordance with the report submitted in House Document Numbered Six hundred and six, Sixty-first Congress, second session, twenty-five thousand dollars: *Provided*, That the Secretary of War may enter into a contract or contracts for such materials and work as may be necessary to complete the said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate four hundred and thirty-four thousand dollars, exclusive of the amounts herein and heretofore appropriated: *Provided further*, That no part of this amount shall be expended until the Secretary of War shall have received satisfactory assurances that the city of Providence, or other local agency, will expend on the improvement of the harbor front, in accordance with said document above referred to, a sum equal to the amount herein appropriated and authorized.

Provisos. Contracts.

Contribution by Providence.

Pawcatuck River, R. I. and Conn.

Improving Pawcatuck River, Rhode Island and Connecticut: Continuing improvement and for maintenance, fifteen thousand dollars.

Branford, Conn.

Improving harbor at Branford, Connecticut: For maintenance, two thousand dollars.

Bridgeport, Conn.

Improving harbor at Bridgeport, Connecticut: For maintenance, ten thousand dollars.

Improving harbor at Bridgeport, Connecticut: Completing improvement, in accordance with the report submitted in House Document Numbered Seven hundred and fifty-one, Sixty-first Congress, second session, ninety thousand dollars.

Duck Island, Conn. Harbor of refuge.

Harbor of refuge at Duck Island, Connecticut: Continuing improvement in accordance with the report submitted in House Document Numbered Three hundred and ninety-eight, Sixtieth Congress, first session, sixty thousand dollars.

Saugatuck River and harbors to New York state line.

Improving harbors at Fivemile River, Stamford, Southport, Greenwich, and Westport, and Saugatuck River, Connecticut: Continuing improvement and for maintenance, forty thousand dollars.

Milford, Conn.

Improving harbor at Milford, Connecticut: For maintenance, two thousand dollars.

New Haven, Conn. Breakwater.

Breakwater at New Haven, Connecticut: Continuing construction, one hundred thousand dollars.

Harbor maintenance.

Improving harbor at New Haven, Connecticut: For maintenance, including channel by way of Oyster Point to Kimberly Avenue Bridge on West River, and for continuing improvement with a view to securing increased depth and the removal of rocks in Morris Cove, in accord-

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ance with the report submitted in House Document Numbered Eleven hundred and fifty-nine, Sixtieth Congress, second session, sixty-eight thousand dollars.

New London, Conn.

Improving harbor at New London, Connecticut: Completing improvement in Shaws Cove in accordance with the report submitted in House Document Numbered Three hundred and twenty-nine, Sixtieth Congress, first session, twelve thousand dollars.

Norwalk, Conn.

Improving harbor at Norwalk, Connecticut: For maintenance, including channels to South Norwalk and East Norwalk, four thousand dollars.

Connecticut River, Conn., below Hartford.

Improving Connecticut River, Connecticut: Continuing improvement and for maintenance below Hartford, thirty-six thousand dollars.

Eightmile River, Conn.

Improving Eightmile River, Connecticut: Completing improvement in accordance with the report submitted in House Document Numbered Three hundred and twenty-seven, Sixtieth Congress, first session, nine thousand dollars.

Housatonic River, Conn.

Improving Housatonic River, Connecticut: Continuing improvement and for maintenance, twenty thousand dollars.

Thames River, Conn.

Improving Thames River, Connecticut: For maintenance, eleven thousand five hundred dollars, of which amount so much as shall be necessary, not to exceed one thousand five hundred dollars, may be expended in removing obstructions from Shetucket River, in accordance with the report submitted in House Document Numbered Three hundred and ninety-seven, Sixty-first Congress, second session.

Black Rock Harbor, N. Y.

Improving Black Rock Harbor, New York: Continuing improvement, one million dollars.

Buffalo, N. Y. Removing obstructions, etc.

Improving harbor at Buffalo, New York: For the removal of obstructions at and near the north or main entrance, thirty-seven thousand four hundred dollars; and for the removal of the Watson elevator site in accordance with the report of the Board of Engineers for Rivers and Harbors, dated January tenth, nineteen hundred and ten, and printed in Rivers and Harbors Committee Document Numbered Two, Sixty-first Congress, second session, sixty-two thousand two hundred and five dollars: *Provided*, That no part of this latter sum shall be expended until title to the area to be excavated shall have been transferred to the United States free of cost, and until the city of Buffalo shall have relinquished to the United States control of the waterways between a line drawn across the channel at the back limit of the excavation and the present limiting line dividing the part of the present waterway maintained by the United States from that now maintained by the city: *And provided further*, That in lieu of the bulkhead indicated in said report as being necessary in consequence of the excavation to be made, the area to be excavated may be extended to include an additional area between the site of the Watson

Provisos.

Transfer of title, etc.

Alternative project.

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elevator and the first channel way beyond said property which connects the City Ship Canal with the Buffalo River, if in the discretion of the Secretary of War the removal of such additional area is required in the interests of navigation; this additional excavation to be made upon the same conditions as to transfer of title and jurisdiction as indicated above in regard to the area first mentioned.

Cape Vincent, N. Y. Improving harbor at Cape Vincent, New York: Continuing improvement, thirty-six thousand dollars.

Charlotte, N. Y. Improving harbor at Charlotte, New York: For maintenance, and continuing improvement in accordance with the report submitted in House Document Numbered Three hundred and forty-two, Sixty-first Congress, second session, seventy-one thousand six hundred and eighty dollars.

Dunkirk, N. Y. Improving harbor at Dunkirk, New York: Completing improvement in accordance with the report submitted in House Document Numbered Seven hundred and twenty, Sixty-first Congress, second session, ninety-nine thousand two hundred and seventy-five dollars: *Provided*, That no part of this sum shall be expended until satisfactory assurances shall have been received by the Secretary of War that the local authorities will construct a suitable concrete dock or provide such other terminal facilities as may be approved by the Secretary of War.

Proviso.

Dock, etc., by City.

Echo Bay, N. Y. Improving harbor at Echo Bay, New York: Completing improvement in accordance with the report submitted in House Document Numbered Eleven hundred and eighteen, Sixtieth Congress, second session, twenty-two thousand one hundred and ten dollars.

Great Sodus Bay, N. Y. Improving harbor at Great Sodus Bay, New York: For maintenance, thirty thousand dollars.

Great South Bay, N. Y. Improving Great South Bay, New York: Continuing improvement and for maintenance by dredging and construction of jetties, fifty thousand dollars.

Hempstead, N. Y. Improving Hempstead Harbor, New York, in accordance with the report of the Board of Engineers for Rivers and Harbors, dated January eighteenth, nineteen hundred and ten, and printed in Rivers and Harbors Committee Document Numbered One, Sixty-first Congress, second session, twenty-three thousand five hundred dollars: *Provided*, That no part of this sum shall be expended upon the channel above the town wharf until a suitable dumping ground for the material dredged shall have been furnished by the local interests free of cost.

Proviso. Restriction.

Jamaica Bay, N. Y. Improving Jamaica Bay, New York, and entrance thereto in accordance with the report submitted in House Document Numbered Fourteen hundred and eighty-eight, Sixtieth Congress, second session, two hundred and fifty thousand five hundred dollars: *Provided*, That no part of this amount shall be expended until the Secretary of War is satisfied that the city of New York is prepared to undertake its part of the general plan for the improve-

Proviso. Subject to adoption of plan by New York City.

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ment of Jamaica Bay, as outlined in the report cited above.

Improving harbor at Little Sodus Bay, New York: For maintenance, thirty thousand dollars. Little Sodus Bay, N. Y.

Improving New York Harbor, New York: For maintenance, including Ambrose Channel, two hundred thousand dollars. Ambrose Channel, N. Y.

Improving harbor at Ogdensburg, New York: Continuing improvement in accordance with the report submitted in House Document Numbered Nine hundred and twenty, Sixtieth Congress, first session, one hundred thousand dollars. Ogdensburg, N. Y.

Improving harbor at Oswego, New York: Continuing improvement in accordance with plan A and for maintenance, one hundred and twenty-five thousand dollars. Oswego, N. Y.

Improving harbor at Plattsburg, New York: Completing improvement in accordance with the report submitted in House Document Numbered Seven hundred and fifty-nine, Sixty-first Congress, second session, twenty-five thousand five hundred dollars. Plattsburg, N. Y.

Improving harbor at Port Chester, New York: Continuing improvement in accordance with the report submitted in House Document Numbered Eleven hundred and sixty-five, Sixtieth Congress, second session, forty-five thousand dollars. Port Chester, N. Y.

Improving harbors at Port Jefferson, Mattituck, Huntington, and Flushing Bay, New York: Continuing improvement and for maintenance, forty thousand seven hundred and fifty dollars: *Provided*, That no part of this appropriation shall be expended for the improvement of the harbor at Mattituck above the milldam until the local authorities shall have replaced the existing dam and bridge by a bridge with suitable draw spans. Harbors on Long Island, N. Y. *Proviso.* Restriction at Mattituck.

Improving harbors at Rondout and Peekskill, New York: For maintenance, three thousand dollars. Rondout and Peekskill, N. Y.

Improving harbor at Saugerties, New York: Continuing improvement and for maintenance, twelve thousand five hundred dollars. Saugerties, N. Y.

Improving harbor at Tarrytown, New York: Continuing improvement and for maintenance, ten thousand dollars. Tarrytown, N. Y.

Improving Bronx River and East Chester Creek, New York: For maintenance, and continuing improvement, including new work on East Chester Creek, in accordance with the report submitted in House Document Numbered Twelve hundred and fifty, Sixtieth Congress, second session, forty-one thousand dollars. Bronx River and East Chester Creek, N. Y.

Improving Browns Creek, New York: For maintenance, three thousand dollars. Browns Creek, N. Y.

Removing obstructions in East River and Hell Gate, New York: Continuing improvement, including work at the Middle Ground and in the channel between North Brother and South Brother islands, in accordance with the reports submitted in House documents Numbered East River and Hell Gate, N. Y.

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Eleven hundred and eighty-seven and One thousand and eighty-four, Sixtieth Congress, second session, respectively, five hundred thousand dollars: *Provided*, That the depth to be secured in the channel between North Brother and South Brother islands may be made twenty-six feet if, in the opinion of the Secretary of War, such depth is required in the interests of navigation.

Proviso. Channel, North Brother and South Brother Islands.

Harlem River, N. Y. Improving Harlem River, New York: Continuing improvement, one hundred and fifty thousand dollars.

Hudson River, N. Y. Maintenance, etc. Improving Hudson River, New York: For maintenance and continuing improvement in accordance with the report submitted in House Document Numbered Seven hundred and nineteen, Sixty-first Congress, second session, and with a view to completing said improvement within a period of four years, one million three hundred and fifty thousand dollars: *Provided*, That the expenditure of the amounts herein and hereafter appropriated for said improvement shall be subject to the conditions set forth in said document: *Provided further*, That the general plan for the improvement presented in said document shall be subject to such modification as to the location of the dam and in matters of detail as may be recommended by the Chief of Engineers and approved by the Secretary of War.

Provisos. Distribution.

Modification of dam, etc.

Newtown Creek, N. Y. Improving Newtown Creek, New York: For maintenance, ten thousand dollars.

Niagara River, N. Y. Improving Niagara River, New York: Completing improvement in accordance with the report submitted in House Document Numbered Seventy-five, Sixtieth Congress, first session, ten thousand dollars.

Wappinger Creek, N. Y. Improving Wappinger Creek, New York: For maintenance, five thousand dollars.

Westchester Creek, N. Y. Improving Westchester Creek, New York, in accordance with the report of the Board of Engineers for Rivers and Harbors dated April fifteenth, nineteen hundred and seven, and printed in Rivers and Harbors Committee Document Numbered Seven, Sixty-first Congress, second session, ten thousand dollars.

Arthur Kill, N. Y. and N. J. Improving Arthur Kill, New York and New Jersey: For maintenance of improvement of Arthur Kill and the waters connecting Raritan Bay with New York Harbor, including channel between Staten Island and the New Jersey shore, New York and New Jersey, ten thousand dollars.

Kill van Kull to Raritan Bay. Improving channel north of Shooters Island, between New York and New Jersey, being an extension of an existing project for the improvement of Arthur Kill or Staten Island Sound from Kill van Kull to Raritan Bay, in accordance with the report submitted in House Document Numbered Three hundred and thirty-seven, Fifty-ninth Congress, second session, one hundred thousand dollars: *Provided*, That the Secretary of War may enter into a contract or contracts for such materials and work as may be necessary to complete the project, to be paid

Proviso. Contracts.

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for as appropriations may, from time to time, be made by law, not to exceed in the aggregate one hundred and eighty thousand one hundred and fifteen dollars, exclusive of the amount herein appropriated.

Keyport Harbor, etc., N. J.

Improving Keyport Harbor, Matawan Creek, Raritan and South rivers, Shoal Harbor and Compton Creek, and Cheesequake Creek, New Jersey: Continuing improvement and for maintenance, eighty thousand dollars.

Raritan Bay, N. J.

Improving Raritan Bay, New Jersey: For maintenance, twenty thousand dollars.

Alloway Creek, N. J.

Improving Alloway Creek, New Jersey: For maintenance, three thousand five hundred dollars.

Cooper Creek, N. J.

Improving Cooper Creek, New Jersey: Continuing improvement and for maintenance, eight thousand dollars.

Mantua Creek, N. J.

Improving Mantua Creek, New Jersey: Continuing improvement and for maintenance, twenty-eight thousand dollars.

Maurice River, N. J.

Improving Maurice River, New Jersey, in accordance with the report submitted in House Document Numbered Six hundred and sixty-four, Fifty-ninth Congress, first session, twenty-five thousand dollars.

Oldmans Creek, N. J.

Improving Oldmans Creek, New Jersey, up to the town of Auburn, in accordance with the report submitted in House Document Numbered One thousand and eighty-three, Sixtieth Congress, second session, forty-five thousand dollars: *Provided*, That no part of this sum shall be expended until all land required for right of way for the necessary cut-offs shall have been deeded free of cost to the United States and the United States shall have been released from all claims for damages arising from the proposed diversion of the stream.

Proviso. Right of way, etc.

Raccoon Creek, N. J.

Improving Raccoon Creek, New Jersey: Continuing improvement and for maintenance, twelve thousand five hundred dollars.

Salem River, N. J.

Improving Salem River, New Jersey: Continuing improvement and for maintenance, twelve thousand dollars.

Shrewsbury River, N. J.

Improving Shrewsbury River, New Jersey: For maintenance, ten thousand dollars.

Double Creek, N. J.

Improving Double Creek, New Jersey: Completing improvement, in accordance with House Document Numbered Six hundred and forty-six, Sixty-first Congress, second session, seven thousand eight hundred dollars: *Provided*, That no part of this appropriation shall be available for expenditure until the township of Union, Ocean County, New Jersey, shall have accepted the authority of the State of New Jersey to maintain the said improvement and made provision for maintenance, in such manner and form as shall be satisfactory to the Secretary of War: *Provided further*, That all rights of way necessary for this improvement shall be furnished free of cost to the United States.

Proviso. Maintenance by Union.

Rights of way.

Toms River, N. J.

Improving Toms River, New Jersey: Completing improvement in accordance with the report submitted in House Document Numbered Three hundred and forty-

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six, Sixtieth Congress, first session, ten thousand and fifty dollars.

Tuckerton Creek, N. J.

Improving Tuckerton Creek, New Jersey: Continuing improvement and for maintenance, twelve thousand dollars.

Woodbridge Creek, N. J.

Improving Woodbridge Creek, New Jersey: For maintenance, three thousand dollars.

Delaware River. Fishers Point to the Bay.

Improving Delaware River, Pennsylvania, New Jersey, and Delaware: Continuing improvement and for maintenance from Fishers Point to Delaware Bay, eight hundred thousand dollars: *Provided*, That of this amount so much as may not be required for maintenance of improvement in accordance with the existing project shall be expended for widening the channel at the bends below the city of Philadelphia with a view to securing, so far as practicable, a channel of equal safety and efficiency in all its parts, and with a further view to securing an ultimate depth of thirty-five feet, in accordance with the project submitted in House Document Numbered Seven hundred and thirty-three, Sixty-first Congress, second session.

Proviso. Channel below Philadelphia.

Philadelphia to Trenton.

Improving Delaware River, from Allegheny avenue, Philadelphia, to Trenton, New Jersey, in accordance with the report submitted in House Document Numbered Seven hundred and two, Sixty-first Congress, second session, one hundred thousand dollars: *Provided*, That the Secretary of War may enter into a contract or contracts for such materials and work as may be necessary to complete the said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate two hundred and sixty thousand dollars, exclusive of the amounts herein and heretofore appropriated.

Proviso. Contracts.

Bar at mouth of Neversink River.

Improving Delaware River, New York, New Jersey, and Pennsylvania: For the removal of a ledge known as Sims Clip at or near the mouth of Neversink River, six thousand six hundred and twelve dollars and fifty cents: *Provided*, That no part of this amount shall be expended until the States of New York, New Jersey, and Pennsylvania, or other local interests, shall have deposited in the Treasury of the United States to the credit of the Secretary of War the sum of fifty-four thousand seven hundred and eighty dollars, to be expended under the direction of the Secretary of War and the supervision of the Chief of Engineers for work in the Delaware and Neversink rivers, all in accordance with the report and recommendations submitted in House Document Numbered Eleven hundred and sixty-four, Sixtieth Congress, second session.

Proviso. Deposit of contribution by New York, etc.

Erie, Pa.

Improving harbor at Erie, Pennsylvania: Continuing improvement in accordance with the report of the Board of Engineers for Rivers and Harbors, dated February fourth, nineteen hundred and ten, and printed in Rivers and Harbors Committee Document Numbered Twenty-

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six, Sixty-first Congress, second session, seventy thousand dollars.

Ice harbor at Marcushook, Pennsylvania: For maintenance, six hundred dollars. Marcushook, Pa.

Improving harbor at Pittsburg, Pennsylvania: For maintenance, five thousand dollars. Pittsburg, Pa.

Improving Allegheny River, Pennsylvania: For maintenance by open-channel work, five thousand dollars. Allegheny River, Pa. Maintenance.

Improving Allegheny River, Pennsylvania: For the repair and reconstruction of Dam Numbered Three, including restoration of the bank at the abutment of said dam, forty-eight thousand two hundred and thirty-three dollars. Dam No. 3.

Improving Monongahela River, Pennsylvania: For completing reconstruction of Lock and Dam Numbered Two, forty-three thousand dollars. Monongahela River, Pa.

Improving Youghiogheny River, Pennsylvania, up to West Newton, in accordance with the report of the Board of Engineers for Rivers and Harbors, dated December twenty-first, nineteen hundred and eight, and printed in Rivers and Harbors Committee Document Numbered Nine, Sixty-first Congress, second session, one hundred thousand dollars. Youghiogheny River, Pa.

Improving harbor of refuge, Delaware Bay, Delaware: For maintenance, eight thousand dollars. Delaware Bay. Harbor of Refuge, Del.

Constructing pier in Delaware Bay near Lewes, Delaware: For maintenance, one thousand five hundred dollars. Pier at Lewes, Del.

Improving harbor at Wilmington, Delaware: For restoration and maintenance, one hundred thousand dollars. Wilmington, Del.

Improving Appoquinimink, Murderkill, and Mispillion rivers, Delaware: Continuing improvement and for maintenance, sixty thousand dollars. Appoquinimink, etc., rivers, Del.

Improving Broad Creek River, Delaware: For maintenance, two thousand dollars. Broad Creek River, Del.

Improving Broadkill River, Delaware: For maintenance, five thousand dollars. Broadkill River, Del.

Improving Saint Jones River, Delaware: For maintenance, and continuing improvement from the mouth to Dover, in accordance with the report submitted in House Document Numbered Eleven hundred and sixteen, Sixtieth Congress, second session, twenty-five thousand dollars: *Provided*, That no part of said amount shall be expended until a satisfactory title to the land required for the necessary cut-offs shall have been transferred to the United States free of cost, and the United States shall have been released from all claims for damages arising from the proposed diversion of the stream. Saint Jones River, Del. *Proviso.* Title to cut-offs, etc.

Improving Smyrna River, Delaware: For maintenance, and continuing improvement in accordance with the report submitted in House Document Numbered Eight hundred and fifteen, Sixtieth Congress, first session, twenty-five thousand dollars: *Provided*, That no part of said amount shall be expended until satisfactory title to Smyrna River, Del. *Proviso.* Title to cut-offs, etc.

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the land required for the necessary cut-offs shall have been transferred to the United States free of cost.

Leipsic River, Del.

Improving Leipsic River, Delaware: Completing improvement in accordance with the report submitted in House Document Numbered Five hundred and seventy-four, Sixty-first Congress, second session, eighteen thousand five hundred dollars: *Provided*, That no part of said amount shall be expended until a satisfactory title to the land required for the necessary cut-offs shall have been transferred to the United States free of cost and the United States shall have been released from all claims for damages arising from the proposed diversion of the stream.

Proviso. Title to cut-offs, etc.

Inland waterway, Chincoteague Bay, Va., to Delaware Bay.

Inland waterway from Chincoteague Bay, Virginia, to Delaware Bay, Delaware: For restoration and repair of existing bridges built by the United States, one thousand five hundred dollars.

Baltimore, Md. Maintenance.

Improving harbor at Baltimore, Maryland: For maintenance of improvement of harbor of Southwest Baltimore, thirty-four thousand dollars; for maintenance of improvement of channel of Curtis Bay, Baltimore Harbor, ten thousand dollars.

Crisfield, Md.

Improving harbor at Crisfield, Maryland: Completing improvement, ten thousand and fifty-five dollars.

Chesapeake Bay, Md. Eastern shore harbors, etc.

Improving harbors at Rockhall, Queenstown, Claiborne, and Cambridge, and Chester, Choptank, Warwick, and Manokin rivers, and Tyaskin Creek, Maryland: Continuing improvement and for maintenance, eighty thousand dollars.

Lower Thoroughfare, Md.

Improving Lower Thoroughfare, at or near Wenona, Deal Island, Maryland: Completing improvement in accordance with the report submitted in House Document Numbered Seventy-six, Sixtieth Congress, first session, five thousand three hundred dollars.

Elk River, Md.

Improving Elk River, Maryland: For maintenance, ten thousand dollars.

Nanticoke River, Del. and Md.

Improving Nanticoke River, Delaware and Maryland: Completing improvement in accordance with the report submitted in House Document Numbered Six hundred and seventy-four, Sixty-first Congress, second session, and improving Northwest Fork of Nanticoke River (Marshyhope Creek), Maryland, in accordance with plan numbered one as recommended in report submitted in House Document Numbered Eight hundred and sixty-nine, Sixtieth Congress, first session, twelve thousand nine hundred and sixty dollars.

Susquehanna River. Havre de Grace, Md.

Improving Susquehanna River above and below Havre de Grace, Maryland: Continuing improvement, twenty thousand dollars.

Wicomico River, Md.

Improving Wicomico River, Maryland: For maintenance, and continuing improvement in accordance with the report submitted in House Document Numbered Five hundred and sixty-nine, Sixty-first Congress, second ses-

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sion, twenty-nine thousand dollars: *Provided*, That no part of said amount shall be expended until title to the land required for the necessary right of way and for the disposition of dredged material shall have been transferred to the United States free of cost. *Proviso.* Right of way.

Improving Anacostia River, District of Columbia: Continuing improvement and for maintenance, two hundred and thirty thousand dollars. Anacostia River, D. C.

Improving Potomac River: Continuing improvement and for maintenance at Washington, District of Columbia, one hundred and eighty thousand dollars. Potomac River. Washington, D. C.

Improving Potomac River at Alexandria, Virginia, in accordance with the report submitted in House Document Numbered Twelve hundred and fifty-three, Sixtieth Congress, second session, sixty thousand dollars. Alexandria, Va.

Improving Potomac River at Lower Cedar Point, Maryland: Completing improvement in accordance with the plan recommended in House Document Numbered Nine hundred and eighteen, Sixtieth Congress, first session, thirteen thousand three hundred dollars. Lower Cedar Point, Md.

Improving harbor at Cape Charles City, Virginia: Continuing improvement and for maintenance, twenty thousand dollars. Cape Charles City, Va.

Improving harbor at Milford Haven, Virginia: For maintenance, three thousand dollars. Milford Haven, Va.

Improving harbor at Norfolk, Virginia: Continuing improvement and for maintenance, including channel at Hospital Point, forty-five thousand dollars, of which amount so much as may be necessary, not to exceed thirty thousand dollars, shall be expended in securing increased anchorage area at and near Lamberts Point, in accordance with the report submitted in House Document Numbered Five hundred and fifty-one, Sixty-first Congress, second session. Norfolk, Va. Maintenance, etc.

Improving Norfolk Harbor and the approaches thereto, and the channel to Newport News, with a view to obtaining a depth of thirty-five feet of water from the navy-yard to the sea, and increased depth in the South Branch of the Elizabeth River above the navy-yard, and a thirty-five foot channel between Newport News and Old Point, in accordance with the reports and recommendations submitted in House Documents Numbered Five hundred and fifty and Five hundred and fifty-one, Sixty-first Congress, second session, six hundred thousand dollars. Channel to Newport News, etc.

Improving Appomattox River, Virginia: Continuing improvement and for maintenance of channel and the diversion works at Petersburg, including work recommended in the report submitted in House Document Numbered Nine hundred and fifty-two, Sixtieth Congress, first session, thirty-three thousand dollars. Appomattox River, Va.

Improving Dymers Creek, Virginia: Completing improvement in accordance with the report submitted in House Document Numbered Three hundred and twenty- Dymers Creek, Va.

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five, Sixty-first Congress, second session, nine thousand dollars.

James River, Va. Improving James River, Virginia: Continuing improvement and for maintenance, two hundred and fifty thousand dollars.

Nansemond River, Va. Improving Nansemond River, Virginia: For maintenance, five thousand dollars.

Nomini Creek, Va. Improving Nomini Creek, Virginia: Continuing improvement and for maintenance, five thousand dollars.

Onancock River, Va. Improving Onancock River, Virginia: Completing improvement in accordance with the report submitted in House Document Numbered Six hundred and fifty-two, Sixtieth Congress, first session, thirteen thousand five hundred dollars.

Pagan River, Va. Improving Pagan River, Virginia: Completing improvement in accordance with the report submitted in House Document Numbered Three hundred and ninety-seven, Sixtieth Congress, first session, four thousand six hundred dollars.

Rappahannock River, Va. Improving Rappahannock River, Virginia: For maintenance, fifteen thousand dollars.

Upper Machodoc Creek, Va. Improving Upper Machodoc Creek, Virginia, in accordance with the report of the Board of Engineers for Rivers and Harbors, dated December twentieth, nineteen hundred and nine, and printed in Rivers and Harbors Committee Document Numbered Four, Sixty-first Congress, second session, ten thousand dollars.

Urbana Creek, Va. Improving Urbana Creek, Virginia: Continuing improvement and for maintenance, eight thousand five hundred dollars.

York, etc., rivers, Va. Improving York, Mattaponi, and Pamunkey rivers, and Occoquan Creek, Virginia: Continuing improvement and for maintenance, fifty thousand dollars.

Waterway, coast of Virginia. Improving waterway on the coast of Virginia: Completing improvement in accordance with the report submitted in House Document Numbered Nine hundred and fifty-seven, Sixtieth Congress, first session, twelve thousand one hundred dollars.

Waterway, Norfolk to Albemarle Sound, N. C. Improving waterway from Norfolk Harbor, Virginia, to Albemarle Sound, North Carolina: For maintenance of improvement of inland water route from Norfolk, Virginia, to Albemarle Sound, North Carolina, through Currituck Sound, five thousand dollars.

To Beaufort Inlet, N. C. Improving inland waterway from Norfolk, Virginia, to Beaufort Inlet, North Carolina: The Secretary of War is hereby authorized to enter into negotiations for the purchase, as a part of said inland waterway, of the Albemarle and Chesapeake Canal, or the Dismal Swamp Canal, together with all property, rights of property, and franchises appertaining thereto; and he is further authorized, if in his judgment the price is reasonable and satisfactory, to make a contract for the purchase of either of said canals and appurtenances, subject to future rati-

Purchase of Albemarle and Chesapeake, or Dismal Swamp, canals.

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fication and appropriation by Congress: *Provided*, That no contract for the purchase of either of said canals shall be made unless such purchase, after full hearing of all parties in interest, is recommended in the survey report to be hereafter submitted in compliance with the directions of Congress in the river and harbor Act approved March third, nineteen hundred and nine: *Provided further*, That said report shall include estimates of the total cost of the completion of each of said canals, including also the purchase price of each, with the advantages of each for commerce.

Provisos. Restriction on contract.

Total estimates required.

Improving waterway from Norfolk, Virginia, to sounds of North Carolina: For maintenance, five thousand dollars.

Maintenance of waterways, Va. and N. C.

Improving harbor at Beaufort, North Carolina: For maintenance, five thousand dollars.

Beaufort, N. C.

Improving Beaufort Inlet, North Carolina: For maintenance, seven thousand five hundred dollars.

Beaufort Inlet, N. C.

Improving Shallowbag Bay, North Carolina: Completing improvement in accordance with the report submitted in House Document Numbered Nine hundred and six, Sixtieth Congress, first session, thirteen thousand seven hundred and fifty dollars.

Shallowbag Bay, N. C.

Improving Bay River, North Carolina: Completing improvement in accordance with the report submitted in House Document Numbered Five hundred and eighty-three, Sixty-first Congress, second session, twenty-one thousand dollars.

Bay River, N. C.

Improving Cape Fear River above Wilmington, North Carolina: Continuing improvement, with a view to securing a navigable depth of eight feet up to Fayetteville, including surveys and acquisition of land for sites for locks and dams and completion of plans for the same, in accordance with the report submitted in House Document Numbered Eight hundred and ninety, Sixtieth Congress, first session, one hundred thousand dollars: *Provided*, That the Secretary of War may enter into a contract or contracts for such materials and work as may be necessary to complete the said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate five hundred and fifteen thousand dollars exclusive of the amounts herein and heretofore appropriated.

Cape Fear River, N. C. Above Wilmington. Locks and dams.

Proviso. Contracts.

Improving Cape Fear River at and below Wilmington, North Carolina: Continuing improvement to such depth in excess of twenty feet as the appropriations for the work may permit, due regard being given to the difference in tidal oscillation at the upper and lower portion of the improvement, four hundred thousand dollars: *Provided*, That if in the judgment of the Secretary of War the prices received in response to advertisement for bids for dredging are not reasonable and less than those at which the Government can perform the same work, so much of

At and below Wilmington.

Proviso. Dredging plant if bids for dredging unreasonable.

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the amount herein appropriated as shall be necessary may be expended for the purchase or construction of a suitable hydraulic dredging plant for use on the Cape Fear River.

Contentnia Creek, N. C. Improving Contentnia Creek, North Carolina: For maintenance, two thousand dollars.

Fishing Creek, N. C. Improving Fishing Creek, North Carolina: For maintenance, one thousand five hundred dollars.

Neuse and Trent rivers, N. C. Improving Neuse and Trent rivers, North Carolina: Continuing improvement and for maintenance, including work in accordance with plan for securing a depth of four feet in Trent River, from Newbern to Trenton, submitted in House Document Numbered Fourteen hundred and seventy-one, Sixtieth Congress, second session, thirty-six thousand dollars.

New River, and waterways Beaufort, N. C. Improving New River, and waterways to Beaufort, North Carolina: Continuing improvement and for maintenance of New River, North Carolina, including inland waterways between Beaufort Harbor and New River and between New River and Swansboro, twenty-three thousand seven hundred dollars, of which sum six thousand seven hundred dollars may be expended upon New River in accordance with the report submitted in House Document Numbered Ten hundred and eighty-five, Sixtieth Congress, second session.

Northeast, etc., rivers, N. C. Improving Northeast, Black, and Cape Fear rivers, North Carolina: For maintenance of improvement of Northeast and Black rivers and of Cape Fear River above Wilmington, North Carolina, seven thousand dollars.

Pamlico and Tar rivers, N.C. Improving Pamlico and Tar rivers, North Carolina: For maintenance, five thousand dollars.

Roanoke River, N. C. Improving Roanoke River, North Carolina: For maintenance, five thousand dollars.

Scuppernong River, N. C. Improving Scuppernong River, North Carolina: For maintenance, two thousand five hundred dollars.

South River, N. C. Improving South River, North Carolina: Completing improvement in accordance with the report submitted in House Document Numbered Nine hundred and fifty-four, Sixtieth Congress, first session, sixteen thousand dollars.

Smiths Creek, N. C. Improving Smiths Creek, North Carolina: Completing improvement in accordance with the report submitted in House Document Numbered Seven hundred and seventy-four, Sixty-first Congress, second session, sixteen thousand two hundred and fifty dollars: *Provided*, That local interests shall construct the bulkhead recommended in said report, and convey to the United States the right to deposit the excavated material behind the said bulkhead:

Proviso. Bulkhead, etc.

Public wharf. *Provided further*, That said local interests shall provide at least one public wharf of adequate facilities the use of which shall be open to all on equal terms.

Swift Creek, N. C. Improving Swift Creek, North Carolina: Completing improvement in accordance with report submitted in House Document Numbered Three hundred and sixty,

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Sixty-first Congress, second session, one thousand six hundred dollars.

Waterway from Pamlico Sound to Beaufort Inlet, North Carolina: For maintenance, ten thousand dollars. Waterway, Pamlico Sound to Beaufort Inlet, N. C.

Improving harbor at Morehead City, North Carolina: Completing improvement in accordance with the report submitted in House Document Numbered Six hundred and forty-nine, Sixty-first Congress, second session, nineteen thousand dollars: *Provided*, That local interests shall construct a bulkhead five hundred feet in length in front of Morehead City and shall cause to be conveyed to the United States the right to deposit between said bulkhead and the shore the material excavated from the channel: *Provided further*, That said local interests, or the town of Morehead City, shall provide at least one wharf of adequate facilities the use of which shall be open to all on equal terms. Morehead City, N. C. *Proviso.* Bulkhead, etc. Public wharf.

Improving harbor at Beaufort, North Carolina: Completing improvement by the construction of a channel from the inland waterway between Norfolk and Beaufort Inlet to the town of Beaufort, by way of Gallants Channel, in accordance with the report submitted in House Document Numbered Five hundred and eleven, Sixty-first Congress, second session, twenty-seven thousand six hundred and seventy-six dollars: *Provided*, That any unexpended balance may be used for constructing a turning basin in front of the town of Beaufort. Beaufort, N. C. *Proviso.* Turning basin.

Improving waterway connecting Swan Quarter Bay with Deep Bay, North Carolina: Completing improvement in accordance with the report submitted in House Document Numbered Four hundred and forty-five, Sixtieth Congress, first session, fourteen thousand five hundred and seventy-five dollars. Waterway, Swan Quarter and Deep bays, N. C.

Improving Waccamaw River, North Carolina and South Carolina: For maintenance, and continuing improvement in accordance with the present project, fifty thousand dollars. Waccamaw River, N. C. and S. C.

Improving harbor at Charleston, South Carolina: Continuing improvement in accordance with the report submitted in House Document Numbered Four hundred and ninety-nine, Fifty-eighth Congress, second session, one hundred and fifty thousand dollars. Charleston, S. C.

Improving Winyah Bay, South Carolina: Continuing improvement in accordance with the report submitted in House Document Numbered Three hundred and ninety-eight, Fifty-eighth Congress, second session, one hundred and fifty thousand dollars. Winyah Bay, S. C.

Improving Great Pedee River, South Carolina: For maintenance of improvement up to Cheraw, thirty thousand dollars. Great Pedee River, S. C.

Improving Little Pedee River, South Carolina: Continuing improvement and for maintenance, twenty thousand dollars. Little Pedee River, S. C.

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Mingo Creek, S. C.

Improving Mingo Creek, South Carolina: For maintenance, one thousand dollars.

Santee, Wateree, and Congaree rivers, S. C.

Improving Santee, Wateree, and Congaree rivers, South Carolina: Continuing improvement and for maintenance, including the Estherville-Minim Creek Canal and the Congaree River as far up as the Gervais Street Bridge, Columbia, ninety-five thousand dollars: *Provided*, That of this amount, so much as may be necessary, not to exceed fourteen thousand dollars, shall be expended in improving Wateree River and not to exceed fifty-six thousand dollars for raising the dam at Granby, on the Congaree River, as recommended in the report submitted in House Document Numbered Six hundred and eight, Sixty-first Congress, first session.

Proviso. Distribution.

Waterways, Charleston and Alligator Creek, S. C.

Improving waterways between Charleston and Alligator Creek, South Carolina: For continuing improvement of inland waterway between Charleston Harbor and McClellanville, including branch to Morrisons Landing, twenty-five thousand dollars.

Brunswick, Ga.

Improving harbor at Brunswick, Georgia: For maintenance, fifty thousand dollars.

Darien, Ga.

Improving harbor at Darien, Georgia: For maintenance, ten thousand dollars.

Sapelo Harbor, Ga.

Improving Sapelo Harbor, Georgia, in accordance with the report submitted in House Document Numbered Five hundred and sixty-one, Sixty-first Congress, second session, ten thousand dollars.

Savannah, Ga.

Improving harbor at Savannah, Georgia: Continuing improvement as recommended in the Annual Report of the Chief of Engineers, United States Army, for the fiscal year ending June thirtieth, nineteen hundred and nine, and with a view to completing said improvement within a period of four years, four hundred thousand dollars.

Altamaha, etc., rivers, Ga.

Improving Altamaha, Oconee, and Ocmulgee rivers, Georgia: Continuing improvement and for maintenance, ninety thousand dollars: *Provided*, That twenty-five thousand dollars of said amount may, if necessary in the discretion of the Secretary of War, be expended on the Ocmulgee River between the cities of Macon and Hawkinsville.

Proviso. Distribution.

Club and Plantation creeks, Ga.

Improving Club and Plantation creeks, Georgia: Completing improvement, twenty thousand seven hundred dollars.

Flint River, Ga.

Improving Flint River, Georgia: Continuing improvement and for maintenance, twenty-five thousand dollars.

Savannah River.

Above Augusta, Ga.

Improving Savannah River, Georgia: Continuing improvement and for maintenance above Augusta, three thousand dollars.

At Augusta.

Improving Savannah River at Augusta, Georgia, in accordance with the report submitted in House Document Numbered Four hundred and eighty-seven, Sixty-first Congress, second session, one hundred and twenty-five

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thousand dollars: *Provided*, That no part of this amount shall be expended until the city of Augusta or other local agency shall have placed in some Uinted States depository a like sum of one hundred and twenty-five thousand dollars to the credit of the Secretary of War, to be expended by him, together with the amount herein appropriated, in connection with this work, all as recommended in the report cited above. *Proviso.* Contribution of city.

Improving Savannah River, Georgia: Continuing improvement and for maintenance below Augusta, in accordance with the report submitted in House Document Numbered Nine hundred and sixty-two, Sixtieth Congress, first session, and with a view to completing said improvement within a period of four years, seventy thousand dollars. Below Augusta.

Improving Chattahoochee River, Georgia and Alabama: Continuing improvement below Columbus, Georgia, and for maintenance, seventy-five thousand dollars. Chattahoochee River, Ga.

Improving Coosa River, Georgia and Alabama: Continuing improvement and for maintenance between Rome, Georgia, and Lock Numbered Four, Alabama, fifty-two thousand five hundred dollars, of which amount so much as shall be necessary may be expended for the care and preservation of the government plant and property at Wetumpka, Alabama. Coosa River, Ga. and Ala.

Improving Coosa River, Georgia and Alabama, by the construction of a lock and dam at Mayos Bar, near Rome, Georgia, as recommended by the Board of Engineers for Rivers and Harbors in its report dated November second, nineteen hundred and eight, and printed in House Document Numbered Eleven hundred and fifteen, Sixtieth Congress, second session, and with a view to completing said lock and dam within a period of two years, one hundred and twenty thousand dollars. Mayos Bar, Ga. Lock and dam.

Improving Coosa River, Georgia and Alabama, by the construction of lock in Dam Numbered Four, and the acquisition of site for Dam Numbered Five, in the State of Alabama, in accordance with the report submitted in House Document Numbered Fourteen hundred and twenty-one, Sixtieth Congress, second session, seventy-five thousand dollars. Dams Nos. 4 and 5.

Improving waterway between Savannah, Georgia, and Fernandina, Florida: For maintenance, twelve thousand five hundred dollars. Waterway, Savannah to Fernandina, Fla.

Improving Apalachicola Bay, Florida: Continuing improvement and for maintenance, including Link Channel and West Pass, twenty-two thousand five hundred dollars. Apalachicola Bay, Fla.

Improving Biscayne Bay, Florida: For maintenance five thousand dollars. Biscayne Bay, Fla.

Improving Carrabelle Bar and Harbor, Florida: Continuing improvement and for maintenance, including East Pass, twenty-five thousand dollars. Carrabelle Bar and Harbor, Fla.

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Channel, Clearwater Harbor to Tampa Bay, Fla. Improving channel from Clearwater Harbor through Boca Ceiga Bay to Tampa Bay, Florida, in accordance with the report submitted in House Document Numbered Eleven hundred and ninety, Sixtieth Congress, second session, twenty-nine thousand five hundred dollars.

Fernandina, Fla. Improving harbor at Fernandina, Florida: For maintenance, including the entrance channel through Cumberland Sound, Georgia and Florida, forty-five thousand dollars.

Hillsboro Bay, Fla. Improving Hillsboro Bay, Florida: Continuing improvement in accordance with the report submitted in House Document Numbered Six hundred and thirty-four, Sixty-first Congress, second session, and subject to the conditions set forth in said document, three hundred thousand dollars.

Pensacola, Fla. Improving harbor at Pensacola, Florida: Continuing improvement and for maintenance, seventy-five thousand dollars.

Saint Andrews Bay, Fla. Improving Saint Andrews Bay, Florida, in accordance with report submitted in House Document Numbered Twelve, Sixty-first Congress, first session, with a view to securing a channel depth of twenty-two feet, seventy-five thousand dollars: *Provided*, That the Secretary of War may enter into a contract or contracts for such materials and work as may be necessary to complete the said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate one hundred and twenty-eight thousand five hundred and sixty dollars, exclusive of the amount herein appropriated.

Proviso. Contracts.

Channel, Apalachicola River to Saint Andrews Bay, Fla. Improving channel from Apalachicola River to Saint Andrews Bay, Florida, in accordance with the report submitted in House Document Numbered Six hundred and seventy, Sixty-first Congress, second session, one hundred thousand dollars.

Sarasota Bay, Fla. Improving Sarasota Bay, Florida: Continuing improvement and for maintenance, thirty thousand dollars.

Santa Rosa Sound, Fla. Improving the narrows in Santa Rosa Sound, Florida: Completing improvement, in accordance with report submitted in House Document Numbered Five hundred and sixty-five, Sixty-first Congress, second session, twenty-four thousand dollars.

Tampa Bay, Fla. Improving Tampa Bay, Florida: For maintenance, nine thousand dollars.

Anclote River, Fla. Improving Anclote River, Florida: Completing improvement, fourteen thousand five hundred dollars.

Apalachicola River, Fla. Improving Apalachicola River, Florida: Continuing improvement and for maintenance, including the cut-off Lee Slough, lower Chipola River, and upper Chipola River from Marianna to its mouth, six thousand five hundred dollars.

Blackwater River, Fla. Improving Blackwater River, Florida: Continuing improvement and for maintenance, twenty-five thousand dollars.

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Caloosahatchee River, Fla.

Improving Caloosahatchee River, Florida, in accordance with the report of the Board of Engineers for Rivers and Harbors, dated January eleventh, nineteen hundred and nine, and printed in Rivers and Harbors Committee Document Numbered Eight, Sixty-first Congress, second session, fifty thousand dollars.

Crystal River, Fla.

Improving Crystal River, Florida: For maintenance, two thousand dollars.

Hillsboro River, Fla.

Improving Hillsboro River, Florida: Continuing improvement, twenty-five thousand dollars.

Holmes River, Fla.

Improving Holmes River, Florida: For maintenance of improvement from Vernon to the mouth, two thousand dollars.

Indian River, Fla.

Improving Indian River, Florida: Continuing improvement between Goat Creek and Jupiter Inlet and for maintenance, thirteen thousand dollars.

Kissimmee River, Fla.

Improving Kissimmee River, Florida: For maintenance, five thousand dollars.

Oklawaha River, Fla.

Improving Oklawaha River, Florida: Continuing improvement and for maintenance from the mouth to Leesburg, including Silver Springs Run, twenty thousand seven hundred and ten dollars: *Provided*, That so much of said sum, together with any funds heretofore appropriated and now remaining to the credit of said project as may be necessary for that purpose, may be used for the maintenance of levels in the lakes at the head of said stream, especially Lake Griffin.

Proviso.
Levels in lakes.

Orange River, Fla.

Improving Orange River, Florida: For maintenance, one thousand five hundred dollars.

Saint Johns River, Fla.

Improving Saint Johns River, Florida, from Jacksonville to the ocean, in accordance with the report submitted in House Document Numbered Six hundred and eleven, Sixty-first Congress, second session, three hundred thousand dollars; continuing improvement opposite the city of Jacksonville, one hundred and fifteen thousand dollars; and improving said river from Jacksonville to Palatka, continuing improvement, thirty-two thousand four hundred dollars, and from Palatka to Lake Harney, in accordance with the report submitted in House Document Numbered Eleven hundred and eleven, Sixtieth Congress, second session, thirty-two thousand four hundred dollars.

Distribution.

Withlacoochee River, Fla.

Improving Withlacoochee River, Florida: For maintenance from the anchorage in the Gulf of Mexico to Pembertons Ferry, six thousand dollars.

Water hyacinth, Fla.
Removing.

Removing the water hyacinth, Florida, Texas, and Louisiana: For the removal of the water hyacinth from the navigable waters of the State of Florida, so far as it is or may become an obstruction to navigation, five thousand dollars.

Choctawhatchee River, Fla. and Ala.

Improving Choctawhatchee River, Florida and Alabama: For maintenance of improvement, including Cypress Top outlet, five thousand dollars.

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Escambia and Conecuh rivers, Fla. and Ala.

Improving Escambia and Conecuh rivers, Florida and Alabama: For maintenance, five thousand dollars.

Mobile, Ala. Bar.

Improving Mobile bar, Alabama: Continuing improvement and for maintenance, nine thousand dollars.

Harbor.

Improving harbor at Mobile, Alabama: Continuing improvement, with a view to securing a depth of twenty-seven feet, in accordance with the report submitted in House Document Numbered Six hundred and fifty-seven, Sixty-first Congress, second session, and with a view to completing said improvement within a period of four years, four hundred and fifty-five thousand dollars, of which amount five thousand dollars may be used in the removal of sunken logs, deadheads, and other obstructions: *Provided*, That in the discretion of the Secretary of War the work of straightening the channel suggested in the report shall not be undertaken until the present channel shall have been dredged to a depth of twenty-seven feet.

Proviso. Restriction.

Alabama River.

Improving Alabama River, Alabama: Continuing improvement and for maintenance, eighty-five thousand dollars: *Provided*, That in the discretion of the Secretary of War the scope of this improvement may be extended to include the Alabama and Coosa rivers between Montgomery and Wetumpka, in accordance with the report submitted in House Document Numbered One thousand and eighty-nine, Sixtieth Congress, second session.

Proviso. Extension.

Black Warrior, Warrior, and Tombigbee rivers, Ala.

Improving Black Warrior, Warrior, and Tombigbee rivers, Alabama: Continuing improvement from Mobile to the Mulberry and Locust forks by the construction of locks and dams, five hundred thousand dollars: *Provided*, That the Secretary of War may enter into a contract or contracts for such materials and work as may be necessary to prosecute the said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate five hundred thousand dollars, exclusive of the amounts herein and heretofore appropriated.

Proviso. Contracts for locks and dams.

From mouth to Walkers Bridge, Miss. Distribution.

Improving Tombigbee River, Alabama and Mississippi: For maintenance, from the mouth to Demopolis, Alabama, thirteen thousand dollars; from Demopolis, Alabama, to Columbus, Mississippi, eleven thousand dollars; from Columbus to Walkers Bridge, Mississippi, ten thousand dollars.

Biloxi, Miss.

Improving harbor at Biloxi, Mississippi: For maintenance, five thousand dollars.

Gulfport, Miss.

Improving harbor at Gulfport, Mississippi: For maintenance of improvement of anchorage basin at Gulfport and channel therefrom to the anchorage or roadstead at Ship Island, and for the improvement and maintenance of channel at Ship Island Pass, one hundred thousand dollars: *Provided*, That the balance of funds heretofore appropriated and now on hand for maintenance of existing project, together with so much of the amount

Proviso. Depth of channel.

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herein appropriated as may be allotted by the Secretary of War for work on the Gulfport channel and anchorage basin, is hereby made available for securing in said channel and anchorage basin such additional depth as may be practicable, not to exceed twenty-three feet.

Horn Island Pass, Miss.

Improving Horn Island Pass, Mississippi: For maintenance, four thousand five hundred dollars.

East Pearl River, Miss.

Improving East Pearl River, Mississippi, in accordance with the report submitted in House Document Numbered Three hundred and twenty-eight, Sixtieth Congress, first session, twenty thousand dollars.

Pascagoula River, Miss.

Improving Pascagoula River, Mississippi: Continuing improvement and for maintenance, ninety-three thousand dollars: *Provided*, That of this amount so much as may be necessary, not to exceed eight thousand dollars, shall be expended in extending the channel up Dog River as recommended in House Document Numbered Six hundred and forty-two, Sixty-first Congress, second session.

Proviso. Extending channel.

Pascagoula, etc., rivers, Miss.

Improving Pascagoula, Chickasahay, and Leaf rivers, Mississippi: For maintenance, fifteen thousand dollars.

Pearl River, Miss.

Improving Pearl River, Mississippi: Continuing improvement and for maintenance below Rockport, twenty-five thousand dollars; for maintenance of improvement between Edinburg and Jackson, five thousand dollars.

Wolf and Jordan rivers, Miss.

Improving Wolf and Jordan rivers, Mississippi: For maintenance, five thousand dollars.

Yazoo River, Miss. Mouth.

Improving Yazoo River, Mississippi: For maintenance of improvement of mouth of Yazoo River and harbor of Vicksburg, four thousand dollars.

Tributaries, etc.

Improving Yazoo River and tributaries, Mississippi: Continuing improvement and for maintenance, including Yazoo, Tallahatchie, Big Sunflower, and Coldwater rivers and Tchula Lake under the existing project, and Steele and Washington bayous and Lake Washington, in accordance with the report submitted in House Document Numbered Nine hundred and four, Sixtieth Congress, first session, and Bear Creek, Mississippi, in accordance with the report submitted in House Document Numbered Nine hundred and eight, Sixtieth Congress, first session, thirty-nine thousand dollars.

Bayou Bartholomew, etc., La.

Improving Bayous Bartholomew, Maçon D'Arbonne, and Corney, and Boeuf and Tensas rivers, Louisiana: For maintenance, sixteen thousand dollars.

Calcasieu River and Pass, La.

Improving Calcasieu River and Pass, Louisiana: For maintenance of improvement of mouth and passes of Calcasieu River, five thousand dollars.

Bogue Falia, etc., La.

Improving Bogue Falia, Bayou Manchac, Amite, Cheffuncte, and Tickfaw rivers, Louisiana: For maintenance, ten thousand dollars.

Bayou Lafourche, La.

Improving Bayou Lafourche, Louisiana: For maintenance, seven thousand five hundred dollars.

Bayou Plaquemine, etc., La.

Improving Bayou Plaquemine, Louisiana: For maintenance of improvement, including Grand River and Pigeon bayous, ten thousand dollars.

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Lake Pontchartrain and Pass Manchac, La.

Improving Lake Pontchartrain and Pass Manchac, Louisiana, in accordance with the reports submitted in House Documents Numbered Eight hundred and eighty-one and Eight hundred and eighty-two, respectively, of the Sixtieth Congress, first session, nine thousand dollars.

Mississippi River. South Pass Channel.

Maintenance of South Pass Channel, Mississippi River: For maintenance, forty thousand dollars.

Southwest Pass.

Improving Southwest Pass, Mississippi River: Continuing improvement and for maintenance, seven hundred and fifty thousand dollars.

Bayou Teche, La.

Improving Bayou Teche, Louisiana: Continuing improvement and for maintenance, fifty thousand dollars.

Bayou Terrebonne, La.

Improving Bayou Terrebonne, Louisiana, in accordance with the limited project submitted in House Document Numbered Eleven hundred and sixty-three, Sixtieth Congress, second session, twenty-five thousand dollars: *Provided*, That no part of this amount shall be expended until title to any land required for the purposes of this improvement shall have been deeded to the United States free of cost.

Proviso. Title, etc.

Bayou Vermilion, etc., La. Distribution.

Improving Bayou Vermilion and Mermentau River, Louisiana: For maintenance of improvement of channel, bay, and passes of Bayou Vermilion and of Mermentau River and tributaries, including Bayou Plaquemine Brulé, in accordance with the report submitted in House Document Numbered Seven hundred and eighty-nine, Sixtieth Congress, first session, ten thousand dollars.

Waterway, Franklin to Mermentau, La.

Improving waterway from Franklin to Mermentau, Louisiana: For maintenance, twelve thousand five hundred dollars.

Inland waterway, Mermentau River to Sabine River, La. and Tex.

Improving inland waterway from Mermentau River, Louisiana, to Sabine River, Louisiana and Texas, in accordance with the report of the Board of Engineers for Rivers and Harbors, dated December twenty-first, nineteen hundred and eight, and printed in Rivers and Harbors Committee Document Numbered Three, Sixty-first Congress, second session, one hundred thousand dollars: *Provided*, That this amount may be applied to any modified plan for this section of the waterway that may be recommended by the Chief of Engineers, United States Army, and approved by the Secretary of War.

Proviso. Modified plan adopted.

Water hyacinth, La. and Tex. Removing.

Removing the water hyacinth, Florida, Texas, and Louisiana: For the removal of the water hyacinth from the navigable waters in the States of Louisiana and Texas, so far as it is or may become an obstruction to navigation, twenty thousand dollars.

Atchafalaya River, La.

Improving Atchafalaya River, Louisiana, from Morgan City to the Gulf of Mexico: Completing improvement and for maintenance in accordance with report submitted in House Document Numbered Six hundred and sixty-nine, Sixty-first Congress, second session, five hundred and thirty thousand dollars; and the Secretary of War is authorized to enter into contract with the Atchafalaya

Contract for maintenance of channel.

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Bay Ship Channel Company for the construction and maintenance for three years of a channel twenty feet deep and two hundred feet wide, in accordance with the terms of proposals numbered one and two of said company, as printed in the report above mentioned: *Provided*, That for payment of expenses of inspection and superintendence of work under this contract the additional sum of ten thousand dollars is hereby appropriated.

Proviso. Inspection, etc.

Improving Red River, Louisiana, Arkansas, Texas, and Oklahoma: Continuing improvement and for maintenance below Fulton, Arkansas, seventy-five thousand dollars; continuing improvement and for maintenance between Fulton, Arkansas, and Denison, Texas, fifty thousand dollars: *Provided*, That of this latter amount so much as shall be necessary may, in the discretion of the Secretary of War, be expended for removing snags and other obstructions in the lower twenty-five miles of the Kiamichi River, a tributary of Red River in the State of Oklahoma.

Red River, La., Ark., Tex., and Okla. Distribution.

Proviso. Kiamichi River.

Improving Aransas Pass, Texas: Completing improvement in accordance with the report submitted in House Document Numbered Six hundred and thirty-nine, Sixty-first Congress, second session, two hundred and seventeen thousand five hundred dollars.

Aransas Pass, Tex.

Improving Galveston Channel, Texas: Continuing improvement under the existing project, which contemplates the excavation of a channel thirty feet deep and one thousand two hundred feet wide from the inner bar to Fifty-first street and seven hundred feet wide from Fifty-first to Fifty-sixth street, two hundred and fifty thousand dollars: *Provided*, That at such time as in the discretion of the Secretary of War the same may be required in the interests of navigation and commerce the western terminus of said channel may be extended to Fifty-seventh street, with a width of one thousand feet between Fifty-first and Fifty-seventh streets, as recommended in the report submitted in House Document Numbered Three hundred and Twenty-eight, Sixty-first Congress, second session.

Galveston Channel, Tex.

Proviso. Extension of channel.

Improving harbor at Galveston, Texas: For maintenance, by dredging and repair of the jetties, three hundred and fifty thousand dollars: *Provided*, That the Secretary of War may, in his discretion, divert such portion of this appropriation as may not be required for this work to the work of improving Galveston Channel.

Galveston, Tex.

Proviso. Diversion.

Improving channel from Galveston Harbor to Texas City, Texas: For maintenance and for dredging within the limits recommended in the report submitted in House Document Numbered Three hundred and twenty-eight, Sixty-first Congress, second session, one hundred thousand dollars.

Channel to Texas City. Maintenance, etc.

Houston Ship Channel (formerly Galveston Ship Channel and Buffalo Bayou), Texas: Continuing improvement and for maintenance, three hundred thousand dollars. And the Secretary of War may enter into con-

Houston Ship Channel, Tex.

Contracts.

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tract for such material and work as may be necessary to complete the present project to an amount not exceeding two million two hundred thousand dollars, exclusive of the amount herein appropriated: *Provided*, That the sum of one million two hundred and fifty thousand dollars, being one-half of the amounts herein appropriated and authorized to be appropriated, shall be furnished for the work by the "Harris County Houston Ship Channel Navigation District," a local organization created and existing under and by virtue of the laws of the State of Texas; and no part of the appropriation herein made shall be available for expenditure, and no contract shall be entered into under the foregoing authorization, until the Secretary of War shall be satisfied that the said navigation district has made provision for furnishing the whole of said sum of one million two hundred and fifty thousand dollars, and has placed to his credit, and subject to his order in a United States depository to be designated by him, three hundred thousand dollars thereof, and has satisfied him that the remainder of said sum will be deposited, in like manner, from time to time, as appropriations for the work may be made by Congress, and in amounts equal to those so appropriated: *Provided further*, That any contract entered into by the Secretary of War under the foregoing authorization shall specifically provide for the completion of the project, and that not more than one-half of the consideration agreed upon shall be furnished and paid by the United States.

Provisos.
Contribution by State navigation district.

Condition of contract.

Deposit of contribution.

Completion of project.

Channel Pass Cavallo to Port Lavaca, Tex.

Improving channel from Pass Cavallo to Port Lavaca, Texas: Completing improvement, with a view to providing a depth of seven feet, in accordance with the report submitted in House Document Numbered Ten hundred and eighty-two, Sixtieth Congress, second session, ten thousand dollars.

Port Bolivar, Tex.

Improving channel to Port Bolivar, Texas: Completing improvement in accordance with the report submitted in House Document Numbered Three hundred and twenty-eight, Sixty-first Congress, second session, ninety-one thousand and eighty dollars.

Sabine Pass, Tex.

Improving Sabine Pass, Texas: Continuing improvement and for maintenance, one hundred and fifty thousand dollars.

Sabine-Neches Canal, etc., Tex.

Board of engineers to consider projects submitted.

The Secretary of War shall appoint a board of engineers to reconsider the project submitted in House Document Numbered Eight hundred and thirty-six, Sixty-first Congress, second session, for the improvement of the Sabine-Neches Canal from the Port Arthur Ship Canal to the mouth of the Sabine River, the Neches River up to the town of Beaumont, and the Sabine River up to the town of Orange, to a navigable depth of twenty-five feet, including a guard lock, and report to Congress on or before December first, nineteen hundred and ten, upon the dimensions and cost of the minimum improvement of the locality which will adequately serve the interests of com-

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merce and the amounts which the United States and the local interests respectively should contribute toward the cost of such adequate improvement, and toward its maintenance after completion. In view of the fact that more extensive cooperation on the part of the local interests in construction and for maintenance is now proposed than was considered in the report heretofore submitted, the board is especially directed to confer with the representatives of such local interests and to submit with its report, for the consideration of Congress, any proposition or propositions for local cooperation that may be presented: *Provided*, That the expenses of the board herein authorized shall be paid from the appropriation for examinations, surveys and contingencies of rivers and harbors.

Conference with local interests.

Report.

Proviso. Expenses.

Improving West Galveston Bay Channel, Turtle Bayou, Trinity River, Anahuac Channel, Oyster Creek, Cedar, Chocolate, and Bastrop bayous, Texas: Continuing improvement and for maintenance, including mouths of adjacent streams, fifty thousand dollars.

West Galveston Bay Channel, etc., Tex.

Improving Brazos River, Texas: Continuing improvement and for maintenance, by open-channel work from Velasco to Old Washington, forty-five thousand dollars.

Brazos River, Tex. Velasco to Old Washington.

Improving Brazos River, Texas, from Old Washington to Waco: For the construction of Lock and Dam Numbered Eight, about seven miles below Waco, seventy-five thousand dollars.

Old Washington to Waco.

Improving Trinity River, Texas: Continuing improvement and for maintenance by open-channel work, forty-nine thousand dollars; for the completion of locks and dams heretofore authorized, eighty-five thousand dollars; and for the construction of Lock and Dam Numbered Seven, and a lock and dam at White Rock Shoals, fifty thousand dollars; in all, one hundred and eighty-four thousand dollars.

Trinity River, Tex. Distribution.

Improving inland waterway on coast of Texas: Continuing improvement and for maintenance of waterway heretofore authorized, fifty thousand dollars; and toward the construction of that section of the waterway between Brazos River and Matagorda Bay, in accordance with the report of the Board of Engineers for Rivers and Harbors dated December twenty-first, nineteen hundred and eight, and printed in Rivers and Harbors Committee Document Numbered Three, Sixty-first Congress, second session, two hundred thousand dollars.

Texas coast inland waterway.

Improving channel from Aransas Pass to Corpus Christi, Texas, with a view to securing a channel depth of twelve feet, as recommended by the Chief of Engineers, United States Army, in the report submitted in House Document Numbered Six hundred and seventy-eight, Sixty-first Congress, second session, one hundred and fifty-seven thousand nine hundred dollars.

Aransas Pass to Corpus Christi, Tex.

Improving Cypress Bayou, Texas and Louisiana: For maintenance, five thousand dollars.

Cypress Bayou, Tex. and La.

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Waterway, Jefferson, Tex., to Shreveport, La.

Improving waterway between Jefferson, Texas, and Shreveport, Louisiana, by the construction of a dam to be so constructed as to admit of a lock when deemed necessary at the foot of Caddo Lake, in accordance with the report submitted in House Document Numbered Two hundred and twenty, Sixtieth Congress, first session, one hundred thousand dollars.

Sulphur River, Tex. and Ark.

Improving Sulphur River, Texas and Arkansas: For maintenance, seven thousand five hundred dollars.

Ouachita River, Ark. and La.

Improving Ouachita River, Arkansas and Louisiana: For maintenance, and continuing improvement by the construction of Locks and Dams Numbered Two, Four, Six, and Eight, five hundred and twenty-one thousand dollars: *Provided*, That of this amount so much as shall be necessary may be expended for surveys with a view to determining the location of Locks and Dams Numbered Three and Seven, and for acquiring title to sites for said Locks and Dams Numbered Three and Seven.

Proviso. Surveys and sites for locks and dams.

Removing snags, etc.

Improving Ouachita River, Arkansas and Louisiana, by removing snags, leaning trees and other obstructions, between Camden and Arkadelphia in the State of Arkansas, ten thousand dollars or so much thereof as may be necessary.

Arkansas River. Construction of dredge boats, etc.

Improving Arkansas River, Arkansas: For the construction and operation of two dredge boats and accessories, in accordance with the reports submitted in House Document Numbered Seventy-one, Sixty-first Congress, first session, and House Document Numbered Five hundred and ten, Sixty-first Congress, second session, three hundred and seventy-five thousand dollars: *Provided*, That the dredging plant herein provided for shall be employed at those points where most needed in the interests of commerce and navigation between the mouth of the river and Ozark.

Proviso. Employment.

Pine Bluff, Ark.

Improving Arkansas River, Arkansas: For maintenance of improvement, including works at Pine Bluff, fifty-one thousand dollars.

Black and Current rivers, Ark.

Improving Black and Current rivers, Arkansas and Missouri: For maintenance, nineteen thousand five hundred dollars.

Cache River, Ark.

Improving Cache River, Arkansas: For maintenance, three thousand dollars.

Saint Francis River, Ark.

Improving Saint Francis River, Arkansas: For maintenance of improvement of Saint Francis and L'Anguille rivers, nine thousand five hundred dollars: *Provided*, That of this sum an amount not exceeding five hundred dollars may, in the discretion of the Secretary of War, be applied to work of removing snags and other obstructions from Blackfish Bayou, in accordance with the report submitted in House Document Numbered Seventy-three, Sixty-first Congress, first session.

Proviso. Removing snags, etc.

Saline River, Ark.

Improving Saline River, Arkansas: Completing improvement in accordance with the report submitted in House Document Numbered Twelve hundred and twelve,

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Sixtieth Congress, second session, five thousand four hundred dollars.

Improving White River, Arkansas: For maintenance, seventeen thousand five hundred dollars. White River, Ark.

Improving Cumberland River above Nashville, Tennessee: For maintenance, ten thousand dollars; and for completing construction of Lock and Dam Numbered Twenty-one, eighty-five thousand dollars; in all, ninety-five thousand dollars: *Provided*, That, except for maintenance, no part of this appropriation shall be expended until the Secretary of War has received satisfactory assurance that local interests will provide a suitable landing place, convenient to the city of Burnside, which shall be open forever to the public on just and equal terms. Cumberland River. Above Nashville, Tenn. *Proviso.* Landing place at Burnside.

Improving Cumberland River below Nashville, Tennessee: For maintenance, ten thousand dollars. Maintenance.

Improving Cumberland River below Nashville, Tennessee, in accordance with the reports submitted in House Documents Numbered Seven hundred and fifty-eight, Sixtieth Congress, first session, and Fourteen hundred and eighty-one, Sixtieth Congress, second session, respectively, two hundred and thirteen thousand dollars: *Provided*, That the Secretary of War may enter into a contract or contracts for such materials and work as may be necessary to prosecute the said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate four hundred and fifty thousand dollars, exclusive of the amounts herein and heretofore appropriated: *Provided further*, That the amount herein appropriated and authorized shall be applied to the necessary surveys and the acquisition of land required for sites of Locks and Dams B, C, D, E, and F, and toward the construction of Locks and Dams B and C. Below Nashville. *Provisos.* Contracts. Surveys and sites for locks and dams.

Improving Obion and Forked Deer rivers, Tennessee: Continuing improvement and for maintenance, four hundred and thirty-seven dollars. Obion and Forked Deer rivers, Tenn.

Improving Clinch and Hiwassee rivers, Virginia and Tennessee: Continuing improvement and for maintenance, seventeen thousand dollars: *Provided*, That of this amount not to exceed two thousand dollars may be expended on Clinch River, in the State of Virginia, in accordance with the report submitted in House Document Numbered Seventy-five, Fifty-sixth Congress, second session. Clinch and Hiwassee rivers, Va. and Tenn. *Proviso.* Amount in Virginia.

Improving French Broad River, Tennessee: Continuing improvement and for maintenance of French Broad and Little Pigeon rivers, twenty-three thousand dollars. French Broad River, Tenn.

Improving Tennessee River above Chattanooga, Tennessee: Continuing improvement and for maintenance, one hundred and twenty thousand dollars: *Provided*, That of this sum fifteen thousand dollars, or so much thereof as may be necessary, shall be used in removing ob- Tennessee River. Above Chattanooga, Tenn. *Proviso.* Removing obstructions.

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structions in that section of the river from the mouth of Richland Creek, to Knott, near Euchee.

Below Chattanooga. Distribution.

Improving Tennessee River below Chattanooga, Tennessee, Alabama, and Kentucky: Continuing improvement at Hales Bar, Tennessee, fifty thousand eight hundred and seventy-five dollars; continuing improvement and for maintenance by open-channel work from Chattanooga, Tennessee, to Riverton, Alabama, three hundred and ten thousand dollars, of which amount fifteen thousand dollars may, if required, be expended in that section of the river between Hobbs Island and Guntersville; continuing improvement at Colbert and Bee Tree Shoals, one hundred thousand dollars; and continuing improvement and for maintenance below Riverton, Alabama, one hundred and fifty thousand dollars; in all, six hundred and ten thousand eight hundred and seventy-five dollars.

Big Sandy River, Va. and Ky.

Improving Big Sandy River, West Virginia and Kentucky: For completing steel service bridge at Lock Numbered One, Big Sandy River, three thousand dollars; for the completion of Lock and Dam Numbered One, Tug Fork, and Lock and Dam Numbered One, Levisa Fork, twenty-five thousand dollars; in all, twenty-eight thousand dollars.

Levisa Fork, Ky.

Improving Levisa Fork, Big Sandy River, Kentucky: Continuing improvement by the construction of Lock and Dam Numbered Two, fifty thousand dollars.

Tug Fork, W. Va. and Ky.

Improving Tug Fork, Big Sandy River, West Virginia and Kentucky: Continuing improvement by the construction of Lock and Dam Numbered Two, fifty thousand dollars.

Kentucky River, Ky.

Improving Kentucky River, Kentucky: For completing construction of Lock and Dam Numbered Thirteen, and beginning construction of Lock and Dam Numbered Fourteen, one hundred and six thousand dollars: *Provided*. That the Secretary of War may enter into a contract or contracts for such materials and work as may be necessary to prosecute the said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate sixty-five thousand dollars, exclusive of the amounts herein and heretofore appropriated: *Provided further*, That of the amount herein appropriated the sum of six thousand dollars may be expended for the construction of a bridge across Tates Creek and the restoration of the county road near Otter Creek, both of which items of work have been rendered necessary by the construction of Locks and Dams Numbered Nine and Ten, Kentucky River.

Provisos. Contracts.

Bridge, Tates Creek, etc.

Guyandot River, W. Va.

Improving Guyandot River, West Virginia: Continuing improvement in accordance with the report submitted in House Document Numbered Five hundred and fifty-eight, Sixtieth Congress, first session, five thousand dollars: *Provided*, That so much of this amount as may be necessary, not to exceed two thousand dollars, shall be

Proviso. Revetting banks.

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expended for revetting the banks to confine the river to its present channel.

Kanawha River, W. Va.

Improving Kanawha River, West Virginia: For restoration of the piers forming the ice harbor at Point Pleasant at or near the mouth of said river, as recommended in the Annual Report of the Chief of Engineers, United States Army, for the fiscal year ending June thirtieth, nineteen hundred and nine, twenty-four thousand dollars.

Little Kanawha River, W. Va.

Improving Little Kanawha River, West Virginia: For maintenance and improvement, including the removal of dam at Stouts Mill, five thousand dollars.

Ashtabula, Ohio.

Improving harbor at Ashtabula, Ohio: For maintenance, and continuing improvement in accordance with the report submitted in House Document Numbered Six hundred and fifty-four, Sixty-first Congress, second session, one hundred and fifteen thousand dollars: *Provided*, That the Secretary of War may enter into a contract or contracts for such materials and work as may be necessary to prosecute the said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate three hundred and seventy-six thousand four hundred and thirty dollars, exclusive of the amounts herein and heretofore appropriated.

Proviso. Contracts.

Cleveland, Ohio. Breakwaters, etc.

Improving harbor at Cleveland, Ohio: Continuing improvement, repair of breakwaters, and for maintenance, three hundred and twenty-five thousand dollars, of which amount seventy-five thousand dollars may be expended for dredging and repair of breakwaters and two hundred and fifty thousand dollars, in addition to the further sum of seventy-five thousand dollars of the amount now on hand to the credit of the improvement of said harbor, which is hereby made availiable, for the purpose of connecting the east breakwater extension with the completed work, and for the removal of the old breakwater arm.

Conneaut, Ohio.

Improving harbor at Conneaut, Ohio: For maintenance, and continuing improvement in accordance with the report submitted in House Document Numbered Six hundred and fifty-three, Sixty-first Congress, second session, one hundred and forty-four thousand nine hundred dollars.

Fairport, Ohio.

Improving harbor at Fairport, Ohio: Continuing improvement and for maintenance, one hundred thousand dollars: *Provided*, That the Secretary of War may enter into a contract or contracts for such materials and work as may be necessary to complete the project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate one hundred and fifty thousand dollars, exclusive of the amounts herein and heretofore appropriated.

Proviso. Contracts.

Huron, Ohio.

Improving harbor at Huron, Ohio: For maintenance, three thousand dollars.

Lorain, Ohio.

Improving harbor at Lorain, Ohio: For maintenance, and completing improvement in accordance with the re-

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port submitted in House Document Numbered Six hundred and forty-four, Sixty-first Congress, second session, one hundred and fifty thousand dollars, and the unexpended balances of previous appropriations are hereby made available for this work.

Port Clinton, Ohio. Improving harbor at Port Clinton, Ohio: For maintenance, one thousand dollars.

Sandusky, Ohio. Improving harbor at Sandusky, Ohio: For maintenance, five thousand dollars.

Toledo, Ohio. Improving harbor at Toledo, Ohio: For maintenance, and continuing improvement in accordance with the report submitted in House Document Numbered Eight hundred and sixty-five, Sixtieth Congress, first session, one hundred and forty-five thousand dollars.

Vermilion, Ohio. Improving harbor at Vermilion, Ohio: For maintenance, one thousand dollars.

Ohio River. Securing depth of nine feet. Improving Ohio River: Continuing improvement with a view to securing a navigable depth of nine feet in accordance with the report submitted in House Document Numbered Four hundred and ninety-two, Sixtieth Congress, first session, or such modification thereof as in the discretion of the Secretary of War may be advisable, and with a view to the completion of such improvement within a period of twelve years, one million one hundred and fifty thousand dollars, which amount shall be applied to the purchase of sites for eighteen Locks and Dams Numbered Nine, Ten, Twelve, Fourteen, Fifteen, Sixteen, Seventeen, Twenty, Twenty-one, Twenty-two, Twenty-three, Twenty-four, Twenty-five, Twenty-seven, Twenty-eight, Twenty-nine, Forty-one, and Forty-eight, and toward the construction of Locks and Dams Numbered Seven, Nine, Ten, Twelve, Nineteen, Twenty, Twenty-nine, Forty-one, and Forty-eight: *Provided*, That so much of the sum herein appropriated as shall be necessary may be applied toward the definite location and purchase of sites for additional locks and dams on said river: *Provided further*, That the Secretary of War may enter into a contract or contracts for such materials and work as may be necessary to prosecute the said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate three million five hundred thousand dollars, exclusive of the amounts herein and heretofore appropriated.

Application to specified locks and dams.

Provisos. Additional sites, etc.

Contracts.

Maintenance, etc. Improving Ohio River: Continuing improvement and for maintenance, five hundred and fifty thousand dollars: *Provided*, That so much of this amount as shall be necessary, not to exceed fifty thousand dollars, may, in the discretion of the Secretary of War, be expended in the acquisition of working plant.

Proviso. Working plant.

Completion of specified locks and dams. Improving Ohio River: Continuing improvement by the completion of Locks and Dams Numbered Two, Three, Four, Five, Eight, and Eleven, one hundred and twenty-five thousand dollars.

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Improving harbor at Alpena, Michigan: For maintenance, five thousand dollars. Alpena, Mich.

Improving harbor at Frankfort, Michigan: Continuing improvement and for maintenance, twenty thousand dollars. Frankfort, Mich.

Improving harbor at Grand Haven, Michigan: For maintenance, ten thousand dollars. Grand Haven, Mich.

Harbor of refuge at Grand Marais, Michigan: Continuing improvement and for maintenance, forty thousand dollars. Grand Marais, Mich.

Harbor of refuge at Harbor Beach, Michigan: For repairs to piers and maintenance of improvement, one hundred thousand dollars. Harbor Beach, Mich.

Improving harbor at Holland, Michigan: For maintenance, twelve thousand dollars. Holland, Mich.

Improving harbor at Ludington, Michigan: For maintenance, ten thousand dollars. Ludington, Mich.

Improving Mackinac Harbor, Michigan, in accordance with the report submitted in House Document Numbered Six hundred and forty-six, Fifty-sixth Congress, first session, twenty-five thousand dollars. Mackinac Harbor, Mich.

Improving harbor at Manistee, Michigan: For maintenance and continuing improvement in accordance with the smaller project submitted in House Document Numbered Seven hundred and five, Sixty-first Congress, second session, thirty-three thousand dollars. Manistee, Mich.

Improving harbor at Manistique, Michigan: Continuing improvement, one hundred and fifty thousand dollars. Manistique, Mich.

Harbor of refuge at Marquette Bay, Michigan: For maintenance, two thousand dollars. Marquette Bay, Mich.

Improving harbor at Marquette, Michigan: For maintenance, and continuing improvement in accordance with the report submitted in House Document Numbered Five hundred and seventy-three, Sixty-first Congress, second session, one hundred thousand dollars. Marquette, Mich.

Improving harbor at Monroe, Michigan: For maintenance, one thousand dollars. Monroe, Mich.

Improving harbor at Muskegon, Michigan: Continuing improvement and for maintenance, seventy thousand dollars. Muskegon, Mich.

Improving harbor at Ontonagon, Michigan: For maintenance, and continuing improvement in accordance with the smaller project submitted in House Document Numbered Six hundred and two, Sixty-first Congress, second session, twenty-five thousand four hundred dollars. Ontonagon, Mich.

Improving harbor at Petoskey, Michigan: Continuing improvement and for maintenance, twenty thousand dollars. Petoskey, Mich.

Harbor of Refuge at Portage Lake, Manistee County, Michigan: Continuing improvement and for maintenance, thirteen thousand dollars. Portage Lake, Mich.

Improving harbor at Rogers City, Michigan: Completing improvement by opening a channel sixteen feet deep and two hundred feet wide through the bar or reef that Rogers City, Mich.

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crosses the harbor in front of the wharves, in accordance with report of the Board of Engineers for Rivers and Harbors, dated February ninth, nineteen hundred and ten, and printed in Rivers and Harbors Committee Document Numbered Twenty-eight, Sixty-first Congress, second session, six thousand dollars.

Saugatuck, and Kalamazoo River, Mich.

Improving harbor at Saugatuck, and Kalamazoo River, Michigan: For maintenance, and continuing improvement in accordance with the report submitted in House Document Numbered Six hundred and thirty-five, Sixty-first Congress, second session, twenty thousand dollars.

South Haven, Mich. Restriction.

Improving harbor at South Haven, Michigan: Continuing improvement and for maintenance, fifty thousand dollars; but no portion of this or other appropriations for this locality shall be used (except for the maintenance of existing channels and works) where proper dock lines have not been established and suitable bulkheads built along these lines by the city of South Haven or by the riparian owners and the property lying on the channel side of these dock lines shall have been deeded to the United States free of cost, pursuant to the plan of improvement heretofore adopted.

White Lake and Pentwater, Mich.

White Lake and Pentwater harbors, Michigan: The Secretary of War is hereby authorized and directed to expend the balances of appropriations, and allotments heretofore made for these harbors in maintaining the improvements in accordance with the present projects.

Black River, Mich.

Improving Black River at Port Huron, Michigan: For maintenance, five thousand dollars.

Clinton River, Mich.

Improving Clinton River, Michigan: For maintenance, five thousand dollars.

Detroit River, Mich.

Improving Detroit River, Michigan: Continuing improvement, in accordance with plan A, five hundred and sixty thousand dollars: *Provided*, That such portion of the proposed improvement forming the north entrance to Livingstone channel shall be dredged to the same depth as that authorized for said Livingstone channel.

Proviso. Livingstone Channel, entrance.

Livingstone Channel.

Improving Detroit River, Michigan: Completing improvement of Livingstone channel, in accordance with the report submitted in House Document Numbered Six hundred and seventy-six, Sixty-first Congress, second session, six hundred and thirty thousand dollars.

Rouge River, Mich. *Proviso.* Restriction.

Improving Rouge River, Michigan: For maintenance, twenty thousand dollars: *Provided*, That no part of this sum shall be expended at those points within the limits of the project where shoaling is due to caving banks until the banks shall have been protected by suitable docks or revetments constructed at the expense of the riparian interests.

Saginaw River, Mich.

Improving Saginaw River, Michigan, up to the mouth of the Tittabawassee River, in accordance with the report submitted in House Document Numbered Seven hundred and forty, Sixty-first Congress, second session, fifty thou-

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sand dollars: *Provided*, That the Secretary of War may enter into a contract or contracts for such materials and work as may be necessary to complete the said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate six hundred and thirty-six thousand dollars, exclusive of the amounts herein and heretofore appropriated. *Proviso.* Contracts.

Waterway across Keweenaw Point, Michigan: For the construction of a harbor of refuge at the eastern entrance in accordance with the plans submitted in House Document Numbered Three hundred and twenty-five, Sixtieth Congress, first session, or such modification thereof as may be authorized by the Secretary of War, and subject to the conditions named in said document, thirty-five thousand dollars. Keweenaw Point, Mich.

Improving Menominee Harbor and River, Michigan and Wisconsin: For maintenance, ten thousand dollars. Menominee Harbor and River, Mich. and Wis.

Improving harbor at Ashland, Wisconsin: Continuing improvement and for maintenance, thirty thousand dollars. Ashland, Wis.

Improving harbor at Depere, Wisconsin: Completing improvement in accordance with the report submitted in House Document Numbered Five hundred and twenty-two, Sixty-first Congress, second session, eleven thousand five hundred dollars. Depere, Wis.

Improving harbor at Green Bay, Wisconsin: For maintenance, twenty thousand dollars. Green Bay, Wis.

Improving harbor at Kenosha, Wisconsin: For maintenance, twelve thousand five hundred dollars. Kenosha, Wis.

Improving harbor at Kewaunee, Wisconsin: For maintenance, and continuing improvement in accordance with the report submitted in House Document Numbered Three hundred and twenty-four, Sixtieth Congress, first session, sixty thousand dollars: *Provided*, That no part of this amount shall be expended on work connected with the new project herein authorized until the conditions specified in said report have been complied with. Kewaunee, Wis. *Proviso.* Restriction.

Improving inner harbor at Milwaukee, Wisconsin: The balances remaining of amounts heretofore appropriated and authorized for the improvement of the inner harbor at Milwaukee are hereby made available for the execution of the modified project for the improvement of said harbor recommended by the Board of Engineers for Rivers and Harbors and printed in House Document Numbered Six hundred and sixty-seven, Sixty-first Congress, second session: *Provided*, That the diversion herein authorized shall not be made until the Secretary of War is satisfied that the conditions recommended as precedent thereto have been complied with by the city of Milwaukee. Milwaukee, Wis. Use of balances for inner harbor. Vol. 33, p. 1138. *Proviso.* Compliance with conditions.

Improving harbor at Manitowoc, Wisconsin: For maintenance, seventeen thousand five hundred dollars. Manitowoc, Wis.

Improving harbor at Oconto, Wisconsin: Completing improvement in accordance with plan "C" submitted in the report printed in House Document Numbered Five Oconto, Wis.

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hundred and thirty-eight, Sixty-first Congress, second session, and subject to the conditions relative to cooperation on the part of local interests as set forth in said document, seventy-five thousand dollars.

Port Washington, Wis. Improving harbor at Port Washington, Wisconsin: Completing improvement in accordance with the report submitted in House Document Numbered Three hundred and six, Sixty-first Congress, second session, thirty thousand dollars.

Port Wing, Wis. Improving harbor at Port Wing, Wisconsin: For maintenance, five thousand dollars.

Racine, Wis. Improving harbor at Racine, Wisconsin: For maintenance, and continuing improvement in accordance with the partial project submitted in the Annual Report of the Chief of Engineers, United States Army, for the fiscal year ending June thirtieth, nineteen hundred and nine, two hundred and forty-three thousand dollars.

Sheboygan, Wis. Improving harbor at Sheboygan, Wisconsin: For maintenance, thirty-two thousand five hundred dollars.

Two Rivers, Wis. Improving harbor at Two Rivers, Wisconsin: For maintenance, five thousand dollars.

Fox River, Wis. Improving Fox River, Wisconsin: Continuing improvement, from Depere up to Portage, twenty-five thousand dollars, of which amount three thousand dollars, or so much therof as may be necessary, shall be used for removing bars and snags and otherwise improving Wolf River.

Duluth, Minn. Improving harbor at Duluth, Minnesota, and Superior, Wisconsin: Continuing improvement and for maintenance, five hundred thousand dollars.

Saint Croix River, Wis. and Minn. Improving Saint Croix River, Wisconsin and Minnesota: For maintenance, four thousand dollars.

Agate Bay, Minn. Improving harbor at Agate Bay, Minnesota: For maintenance, two thousand dollars.

Grand Marais, Minn. Improving harbor at Grand Marais, Minnesota: For maintenance, two thousand dollars.

Warroad Harbor, Minn. Improving Warroad Harbor, Minnesota: Completing improvement and for maintenance in accordance with the report submitted in House Document Numbered Seven hundred and three, Sixty-first Congress, second session, seven thousand seven hundred dollars.

Minnesota River, Minn. Improving Minnesota River, Minnesota: For maintenance, two thousand two hundred dollars.

Red River of the North, Minn. and N. Dak. Improving Red River of the North, Minnesota and North Dakota: For maintenance, seven thousand five hundred dollars.

Indiana Harbor, Ind. Indiana Harbor, Indiana: For improvement and maintenance in accordance with the project recommended in House Document Numbered Eleven hundred and thirteen, Sixtieth Congress, second session, sixty-two thousand dollars: *Provided*, That no part of this appropriation shall be expended until the Secretary of war shall be satisfied that the conditions specified in said document have been fully complied with.

Proviso. Conditions.

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Improving harbor at Michigan City, Indiana: Continuing improvement and for maintenance, including repair and maintenance of the east breakwater, sixty-five thousand five hundred dollars. Michigan City, Ind.

Improving Calumet River, Illinois and Indiana: Continuing improvement and for maintenance, ninety-eight thousand dollars: *Provided*, That the project for the improvement of the river, submitted in House Document Numbered One hundred and seventy-two, Fifty-eighth Congress, second session, is hereby modified so as to permit the use of turning basins above number one of such shape and dimensions as will enable a vessel six hundred and fifty feet in length to turn with ease, and is further modified so as to provide a navigable depth of twenty feet from One hundred and twenty-second street to the forks of the river and a turning basin at the forks having a similar depth and a water-surface diameter of seven hundred and fifty feet, in accordance with the project set forth in House Document Numbered Three hundred and forty-nine, Sixtieth Congress, first session, and the amounts heretofore appropriated shall be available for such modified project. Calumet River, Ill. and Ind. *Proviso.* Modification of plan

Improving harbor at Calumet, Illinois: For maintenance, thirty thousand dollars. Calumet, Ill.

Improving harbor at Chicago, Illinois: Continuing improvement and for maintenance, two hundred and forty thousand dollars. Chicago, Ill.

Improving harbor at Waukegan, Illinois: For maintenance, ten thousand dollars. Waukegan, Ill.

Improving Chicago River, Illinois: Continuing improvement and for maintenance, one hundred and seventy-five thousand dollars. Chicago River, Ill.

Illinois and Mississippi Canal: For the construction of a lock in the dam in Rock River at the head of the feeder to said canal in accordance with the plan submitted in House Document Numbered One hundred and twenty-six, Fifty-sixth Congress, second session, or such modification thereof as may be approved by the Secretary of War, seventy-five thousand dollars. Illinois and Mississippi Canal. Lock in Rock River.

Improving Illinois River, Illinois: Continuing improvement and for maintenance, thirty thousand dollars. Illinois River, Ill. Maintenance.

Improving Illinois River, Illinois, from Copperas Creek to La Salle: Of the balance remaining from the appropriation heretofore made for this improvement, twelve thousand dollars, or so much thereof as may be necessary, is hereby made available for dredging in Lake Depue and entrance thereto. Copperas Creek to La Salle. Dredging Lake Depue.

Improving Mississippi River, from Head of Passes to the mouth of the Ohio River, including salaries, clerical, office, traveling, and miscellaneous expenses of the Mississippi River Commission: Continuing improvement with a view to securing a permanent channel depth of nine feet and to the completion of said improvement within a period of twenty years, two million dollars, Mississippi River Commission. Mississippi River. From Head of Passes to the Ohio. Securing 9-foot channel.

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which sum shall be expended under the direction of the Secretary of War in accordance with the plans, specifications, and recommendations of the Mississippi River Commission, as approved by the Chief of Engineers, for the general improvement of the river, for the building of

Levees.

levees between the Head of Passes and Cape Girardeau, Missouri, and for surveys, including the survey from the Head of Passes to the headwaters of the river, in such manner as in their opinion shall best improve navigation and promote the interests of commerce at all stages of the river: *Provided*, That from and after the date of the approval of this Act the member of said commission appointed from the Coast and Geodetic Survey shall receive the same annual compensation as other civilian members of said commission, and the excess of said compensation over and above the compensation he receives from the Coast and Geodetic Survey shall be paid from the funds of said commission: *Provided further*, That of the money hereby appropriated so much as may be necessary shall be expended in the construction of suitable and necessary dredge boats and other devices and appliances and in the maintenance and operation of the same: *Provided further*, That the water courses connected with said river, and the harbors upon it, now under the control of the Mississippi River Commission and under improvement, may, in the discretion of said commission, upon approval by the Chief of Engineers, receive allotments for improvements now underway or hereafter to be undertaken to be paid for from the amounts herein appropriated: *And provided further*, That of the amount herein appropriated so much thereof as may be necessary shall be used in making an examination and report upon the necessity, urgency, and practicability of permanently separating the waters of the Red and Atchafalya rivers from those of the Mississippi River, together with an estimate of the cost of such work. The said commission shall prepare a statement as to the localities and quantities of revetment required for the complete treatment of the said river below Cairo and an estimate of the cost thereof, and report the same to Congress. The said commission shall also prepare and report to Congress a statement of the amounts expended by the United States Government in the construction of levees as well as a statement of the amounts expended by States, levee districts, and communities interested. The said commission shall also report to Congress a statement of the quantity of land which will be reclaimed or protected by revetment or other work done by the United States exclusively.

Surveys.

Provisos.

Pay of member from Coast Survey.

Dredging appliances.

Connecting water courses.

Diversion of Red and Atchafalaya rivers.

Estimate of revetment work.

Amount spent for levees, etc.

Land to be protected, etc.

Experimental towboats authorized.

The Chief of Engineers, under the direction of the Secretary of War, is hereby, authorized to design and construct two experimental tow-boats of modern but different types, with a complement of suitable barges and necessary loading and unloading facilities for towing and deliver-

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ing supplies along the Mississippi River and its tributaries, and in making designs for such boats the said Chief of Engineers shall investigate and consider types of boats in use for similar purposes on nontidal rivers in this and other countries, and for the purposes of such investigation, designs, and construction there is hereby appropriated the sum of five hundred thousand dollars.

From the Ohio to the Missouri.

Improving Mississippi River from the mouth of the Ohio River to and including the mouth of the Missouri River: Continuing improvement in accordance with the plan adopted in eighteen hundred and eighty-one, which has for its object to eventually obtain by regularization works and by dredging a minimum depth of eight feet from the mouth of the Ohio River to Saint Louis, and of six feet from Saint Louis to the mouth of the Missouri River, and with a view to the completion of said improvement within a period of twelve years, five hundred thousand dollars.

Depth to be obtained.

From the Missouri to Minneapolis.

Improving Mississippi River from the mouth of the Missouri River to Minneapolis, Minnesota: Continuing improvement in accordance with the report submitted in House Document Numbered Three hundred and forty-one, Fifty-ninth Congress, second session, for the purpose of ultimately securing and maintaining a depth of channel of six feet and with a view of completing said improvement within a period of twelve years, five hundred thousand dollars: *Provided*, That of this amount so much as may be necessary, not to exceed seventy-five thousand dollars, may, in the discretion of the Secretary of War, be expended for the repair and maintenance of existing levees constructed by the United States and for dredging for the benefit of through navigation in harbors and at landing places, giving preference to localities in which the communities interested shall hereafter maintain such dredging without cost to the United States.

Depth.

Proviso. Maintenance of levees.

Saint Paul to Minneapolis. Modified project.

Improving Mississippi River, from Saint Paul to Minneapolis: The modified project recommended by the Chief of Engineers in his report dated March third, nineteen hundred and ten, printed in House Document Numbered Seven hundred and forty-one, Sixty-first Congress, second session, is hereby adopted, and all future work on said improvement shall be prosecuted in accordance therewith: *Provided*, That in the making of leases for water power a reasonable compensation shall be secured to the United States, and the rates as fixed shall be subject to revision by Congress.

Proviso. Water-power leases.

Reservoirs at headwaters. Canal.

Improving Mississippi River in Minnesota: Improving reservoirs at the headwaters of the Mississippi River: Completing improvement by constructing a canal between Lake Winnibigoshish and Leech Lake, in accordance with the report submitted in House Document Numbered Three hundred and sixty-three, Sixty-first Congress, second session, sixty-one thousand two hundred dollars.

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Brainerd to Grand Rapids.

Improving Mississippi River in Minnesota, between Brainerd and Grand Rapids: Completing improvement in accordance with the report submitted in House Document Numbered Six hundred and seven, Sixty-first Congress, second session, twenty-two thousand five hundred and fifty-five dollars.

Waterway from Lockport, Ill., to Mississippi River.

For the construction of a waterway from Lockport, Illinois, by way of the Desplaines and Illinois rivers to the mouth of said Illinois River, one million dollars. The

Board to be appointed.

Secretary of War shall appoint a board of five members, to be composed of four engineer officers of the army and one civil engineer taken from civil life. The president

President.

Vol. 34, p. 1104.

of the board of five members authorized under Act of March second, nineteen hundred and seven, to examine the Mississippi River below Saint Louis and report to Congress on the project of a fourteen-foot channel, shall be a member of and president of the board herein provided for. Said board shall report upon the feasibility

Nature of report.

of such waterway, and the most advisable depth and di-

Levels of Great Lakes.

mensions therefor, in case the same is recommended; also upon such measures as may be required to properly preserve the levels of the Great Lakes and to compensate, so far as practicable, for the diminished level in said lakes and the connecting waters thereof by reason of any diversion of water from Lake Michigan for the maintenance of the proposed waterway herein described, or diversion for any other purpose; and further, also, upon the influence on volume and height of waters in the Mississippi River below Cairo; and further, also, as to the effect upon the climate of the Lake States by a change in

Extent of cooperation of Illinois.

the natural currents of Lake Michigan. The board shall, after full conference with the authorized agency of the State of Illinois, submit a report upon the extent to which the United States may properly cooperate with the State of Illinois in securing the construction of a navigable waterway from Lockport to the mouth of the Illinois River in conjunction with the development of water power by said State between Lockport and Utica, for which the people of the State of Illinois have authorized

Recommendations.

their general assembly to appropriate twenty million dollars; the report shall state the extent and character of the cooperation recommended and the conditions considered necessary in connection therewith to fully protect

Plans and estimates to be submitted.

the interests of the United States. Should the board consider cooperation to be advisable, the report herein called for shall include plans and estimates of cost of the work recommended to be done by the United States alone or in cooperation with the State of Illinois; and until these plans and estimates have been submitted and a project for the improvement adopted by Congress the appropriation of one million dollars herein made shall not be available for expenditure. The board also shall consider and

Report on dams at Jefferson Barracks and Commerce.

report upon the improvement of the Mississippi between the mouth of the Illinois River and the mouth of the Ohio

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River by the construction of a dam at or near Jefferson Barracks and a dam at or near Commerce, and the development of water power incidentally created by such dams. In the performance of its duties the board may consider all reports heretofore made; and the force, plant, and records of the Mississippi River Commission and the several engineer districts between Chicago and Cairo shall be available for the use of the board. The members of the board herein authorized shall be entitled to compensation at the rate of six thousand dollars per annum, but the official salary of any officer appointed on said board from the Engineer Corps of the Army shall be deducted from the compensation provided for in this Act. For salaries and expenses of said board, including all necessary clerical and other personal services, there is hereby appropriated the sum of fifty thousand dollars. The reports herein called for shall be submitted to the Chief of Engineers not later than November first, nineteen hundred and ten, reviewed by the Board of Engineers for Rivers and Harbors, and submitted to Congress not later than the first Monday in December, nineteen hundred and ten.

Authority of board.

Compensation.

Appropriation for expenses.

Submission of reports.

Improving Missouri River with a view to securing a permanent six-foot channel between Kansas City and the mouth of the river, one million dollars: *Provided*, That the Secretary of War shall appoint a board of three officers to further consider and report upon the most economical and desirable plan of securing such channel, in which report consideration shall be given to the subject of cooperation on the part of local interests in the work of said improvement: *Provided further*, That the report hereby authorized shall be submitted to Congress on or before the opening of its next regular session.

Missouri River.

Kansas City to mouth.

Provisos.

Engineer board to report plans for 6-foot channel.

Local cooperation.

Submission of reports.

Improving Missouri River: For improvement and maintenance from Kansas City to Fort Benton, three hundred thousand dollars, of which amount one hundred and fifty thousand dollars, or so much thereof as may be necessary, may be expended between Le Beau and Fort Benton.

Kansas City to Fort Benton.

Improving Missouri River at Saint Joseph, Missouri, in accordance with the report submitted in House Document Numbered Eight hundred and twenty-four, Sixtieth Congress, first session, seventy-five thousand dollars: *Provided*, That no part of this amount shall be expended until the city of Saint Joseph, or other agency, shall have deposited to the credit of the Secretary of War in some duly recognized United States depository to be designated by him the sum of seventy-five thousand dollars, to be expended by said Secretary of War, together with the amount herein appropriated, in the execution of the plan of improvement recommended in the report herein referred to.

At Saint Joseph, Mo.

Proviso.

Contribution by city.

Improving Missouri River at Atchison, Kansas, in accordance with the report submitted in House Document

At Atchison, Kans.

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Numbered Seven hundred, Sixty-first Congress, second session, ninety thousand dollars: *Provided*, That no part of this amount shall be expended until the city of Atchison, or other agency, shall have deposited to the credit of the Secretary of War, in some duly recognized United States depository to be designated by him, the sum of ninety thousand dollars, to be expended by said Secretary of War, together with the amount herein appropriated, in the execution of the plan of improvement recommended in the report herein referred to.

Proviso. Contribution by city.

Gasconade River, Mo. Improving Gasconade River, Missouri: Continuing improvement and for maintenance, twenty thousand dollars.

Osage River, Mo. Improving Osage River, Missouri: Continuing improvement and for maintenance, thirty-five thousand dollars: *Provided*, That so much of this amount as shall be necessary may, in the discretion of the Secretary of War, be applied to work of completing the lock and dam on said river.

Proviso. Lock and dam.

Humboldt Bay, Cal. Improving harbor at Humboldt Bay, California: Continuing improvement in accordance with the report submitted in House Document Numbered Nine hundred and fifty, sixtieth Congress, first session, one hundred and fifty thousand dollars.

Oakland, Cal. Improving harbor at Oakland, California: For maintenance, and continuing improvement under the existing project, or, in the discretion of the Secretary of War, in accordance with the new plan of improvement printed in House Document Numbered Six hundred and forty-seven, Sixty-first Congress, second session, two hundred and fifty thousand dollars: *Provided*, That if in the judgment of the Secretary of War the prices received in response to advertisement for bids for dredging are not reasonable, so much of the amount herein appropriated as shall be necessary may be expended for the purchase or construction of a suitable dredging plant: *Provided further*, That the three bridges heretofore built by the United States in connection with this improvement may be turned over to the local authorities to be maintained and operated by them upon such terms as to transfer and control as in the discretion of the Secretary of War may be equitable and just to the United States and to said local authorities: *Provided further*, That of the appropriation herein made so much as shall be necessary may be expended for such alterations and repairs to said bridges as in the discretion of the Secretary of War may be essential to meet the terms of said transfer.

Provisos. Dredging plant.

Transfer of bridges to city.

Repairs, etc., to bridges.

San Diego, Cal. Improving harbor at San Diego, California: Completing improvement in accordance with the lesser project submitted in House Document Numbered Nine hundred and sixty-one, Sixtieth Congress, first session, one hundred and twenty-five thousand dollars.

San Francisco, Cal. Improving harbor at San Francisco, California: The continuing contract authorization provided for in the river and harbor Act approved March third, eighteen

Removal of additional rocks.

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hundred and ninety-nine, is hereby revived and extended to include the removal of three additional rocks in the harbor and entrance thereto, namely, Centissima and the two rocks near the Mail Dock (now reported as being also known as Rincon Reef rocks), in accordance with the report submitted in House Document Numbered Eleven hundred and nineteen, Sixtieth Congress, second session. Vol. 30, p. 1182.

Improving Los Angeles Harbor, California (heretofore called and appropriated for under the names of Wilmington Harbor, California, and San Pedro Harbor, California), three hundred and seventy-eight thousand dollars, as follows: For completing improvement of harbor at San Pedro, California, in accordance with the report submitted in House Document Numbered Nine hundred and sixty-nine, Sixtieth Congress, first session, one hundred and seventy-eight thousand dollars; and for continuing improvement of harbor at Wilmington, California, with a view to securing a channel depth of thirty feet within the limits of the present project, in accordance with the report submitted in House Document Numbered Eleven hundred and fourteen, Sixtieth Congress, second session, two hundred thousand dollars. Los Angeles Harbor, Cal. At San Pedro. At Wilmington.

Improving Los Angeles Harbor (formerly Wilmington Harbor), California, in accordance with report submitted in House Document Numbered Seven hundred and sixty-eight, Sixty-first Congress, second session, two hundred thousand dollars: *Provided*, That if in the judgment of the Secretary of War the prices received in response to advertisement for bids for dredging are not reasonable, so much of the amount herein appropriated as shall be necessary may be expended for the purchase or construction of a suitable dredging plant. Dredging harbor. *Provisos.* Dredging plant.

Improving Mokelumne River, California: For maintenance, two thousand dollars. Mokelumne River, Cal.

Improving Petaluma Creek and Napa River, California: For maintenance, ten thousand dollars. Petaluma Creek and Napa River, Cal.

Improving Redwood Creek, California: Completing improvement by providing a channel depth of five feet, in accordance with the report submitted in House Document Numbered Three hundred and seven, Sixty-first Congress, second session, twelve thousand dollars. Redwood Creek, Cal.

Improving Sacramento and Feather rivers, California: Continuing improvement and for maintenance, thirty thousand dollars. Sacramento and Feather rivers, Cal.

Improving Sacramento and Feather rivers, California: Continuing improvement and toward the controlling of débris and floods, in accordance with the recommendations of the California Débris Commission in its report dated June thirtieth, nineteen hundred and seven (printed in the Annual Report of the Chief of Engineers, United States Army, for nineteen hundred and seven, pages twenty-two hundred and sixty-two to twenty-two hundred and sixty-nine, inclusive), four hundred thousand Controlling débris and floods.

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Provisos. Contribution by State. dollars: *Provided*, That no part of this sum shall be expended unless the State of California shall appropriate for the prosecution of said project a like sum of four hundred thousand dollars and deposit the same in the Treasury of the United States: *Provided further*, That the Treasurer of the United States is hereby authorized to receive from the State of California any and all sums of money that have been or may hereafter be appropriated by said State for the purpose herein set forth; and when so received the said sums are hereby appropriated for said purpose to be expended under the direction of the Secretary of War and the supervision of the Chief of Engineers: *And provided further*, That the work herein provided for shall not be begun until all rights of way needed for levees and spoil banks have been furnished the United States free of cost.

Authority to receive from State.

Rights of way.

Yuba River basin, Cal. Sale of lands, etc. The Secretary of War is authorized, in his discretion, to sell the lands and other property acquired for the construction of the Yuba River settling basin, California, and to modify the project of the California Débris Commission for improving Sacramento and Feather rivers accordingly; the proceeds of the sale to be applied to such modified project.

San Joaquin River, Cal. Improving San Joaquin River, California: For maintenance, including Stockton and Mormon channels, thirty-five thousand dollars, and for continuing improvement in accordance with the report submitted in House Document Numbered Eleven hundred and twenty-four, Sixtieth Congress, second session, forty thousand dollars: *Provided*, That no part of the latter sum shall be expended until title to the land required for the necessary cut-offs shall have been transferred to the United States free of cost.

Proviso. Title to cut-offs.

Suisun Channel, Cal. Improving Suisun Channel, California, in accordance with the report submitted in House Document Numbered Eleven hundred and ten, Sixtieth Congress, second session, twelve thousand five hundred dollars: *Provided*, That no part of this appropriation shall be expended, nor shall further appropriations be made, until the land required for the cut-offs contemplated in the plan of improvement presented shall have been donated for the purpose of said improvement free of cost to the United States.

Proviso. Donation of cut-offs.

Coos Bay, Oreg. Dredge for bar, etc. Improving harbor at Coos Bay, Oregon: For the construction of a seagoing hydraulic dredge for work on the bar at the entrance, three hundred and fifty thousand dollars; and for improving the channels within the bay with a view to securing a depth of eighteen feet up to the town of Marshfield, fifty thousand dollars; in all, four hundred thousand dollars, in accordance with the report submitted in House Document Numbered Nine hundred and fifty-eight, Sixtieth Congress, first session.

Tillamook Bay, Oreg. Improving Tillamook Bay and bar, Oregon: For maintenance, five thousand dollars.

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Improving Clatskanie River, Oregon: Completing improvement and for maintenance in accordance with the report submitted in House Document Numbered Six hundred and thirty-three, Sixty-first Congress, second session, five thousand two hundred dollars. Clatskanie River, Oreg.

Improving Coos River, Oregon: For maintenance, three thousand dollars. Coos River, Oreg.

Improving Coquille River, Oregon: Completing improvement and for maintenance in accordance with the report submitted in House Document Numbered Six hundred and seventy-three, Sixty-first Congress, second session, fifty-six thousand dollars. Coquille River, Oreg.

Improving Siuslaw River, Oregon, at the mouth, in accordance with the project set forth in the report submitted in House Document Numbered Six hundred and forty-eight, Sixty-first Congress, second session, fifty thousand dollars: *Provided*, That the Secretary of War may enter into a contract or contracts for such material and work as may be necessary to complete said project and to maintain the same for one year during construction, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate one hundred and sixty-five thousand five hundred dollars, exclusive of the amount herein appropriated: *Provided, further*, That before beginning said work or making said contract or contracts the Secretary of War shall be satisfied by deposit or otherwise that the port of Siuslaw or other agency shall provide for the accomplishment of said project the additional sum of two hundred and fifteen thousand five hundred dollars, which said sum shall be expended by the Secretary of War in the prosecution of said work and for its maintenance in the same manner and in equal amount as the sum herein appropriated and authorized to be appropriated from the Treasury of the United States: *And provided further*, That the amount to be furnished by the port of Siuslaw or other agency may be reduced by such amounts as said port may have expended in such construction of the south jetty as can be utilized by the engineer officer in charge of the work in the execution of the plans adopted.

Siuslaw River, Oreg. Improvement at mouth.

Provisos. Contracts.

Contribution by Siuslaw.

Reduction of amount.

Improving Willamette River, Oregon: For the purchase of the existing canal and locks around Willamette Falls at Oregon City, Oregon, or for the purchase of the necessary lands and the construction of a new canal and locks, in the discretion of the Secretary of War in accordance with the report submitted in House Document Numbered Two hundred and two, Fifty-sixth Congress, first session, three hundred thousand dollars: *Provided*, That no part of this appropriation shall be expended, except for the acquisition of the necessary lands and rights of way and for such antecedent surveys and preliminary work as may be necessary in this connection, until the State of Oregon shall appropriate for the aforesaid purpose a like amount; and the purchase of the existing canal and

Willamette River, Oreg. Approach to canal and locks around falls.

Provisos. Contribution by State, etc.

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locks, or the actual construction of a new canal and locks, shall not be undertaken until the Secretary of War shall be satisfied that the State of Oregon will deposit the said amount in the Treasury of the United States in such sums and at such times as he may require: *Provided further*,

Authority to receive from State.

That the Treasurer of the United States is hereby authorized to receive from the State of Oregon any and all sums of money that have been been [sic] or may hereafter be appropriated by said State for the purpose herein set forth; and when so received the said sums are hereby appropriated for said purpose to be expended under the direction of the Secretary of War and the supervision of the Chief of Engineers.

Willamette and Yamhill rivers, Oreg.

Improving Willamette and Yamhill rivers, Oregon: Continuing improvement and for maintenance of Willamette River above Portland, and Yamhill River, sixty thousand dollars.

Columbia and Willamette rivers. Below Portland.

Improving Columbia and Lower Willamette rivers below Portland, Oregon: Continuing improvement and for maintenance, one hundred and seventy-five thousand dollars, of which amount so much as shall be necessary may be expended in dredging the west channel at Swan Island for the use of log tows and shoal-water boats.

Columbia River, Oreg. and Wash., at the mouth.

Improving mouth of Columbia River, Oregon and Washington: Continuing improvement and for maintenance, including repairs and operation of dredge, one million two hundred thousand dollars.

Gauging.

For gauging waters of Columbia River and measuring tidal and river volumes, one thousand dollars.

Mouth to Vancouver.

Improving Columbia River, Washington: For maintenance of improvement between the mouth of Willamette River and the city of Vancouver, Washington, ten thousand dollars.

Cascades.

Improving Columbia River at Cascades, Oregon: Continuing improvement, five thousand dollars.

The Dalles Rapids to Celilo Falls.

Improving Columbia River, between the foot of The Dalles Rapids and the head of Celilo Falls, Oregon and Washington: Continuing improvement with a view to completing said improvement within a period of six years, six hundred thousand dollars.

Celilo Falls to mouth of Snake River.

Improving Columbia River and tributaries above Celilo Falls to the mouth of Snake River, Oregon and Washington: Continuing improvement, ninety thousand dollars.

Snake River, Oreg., Wash., and Idaho.

Improving Snake River, Oregon, Washington, and Idaho: Continuing improvement and for maintenance up to Pittsburg Landing, Oregon, in accordance with the present project and the report submitted in House Document Numbered Four hundred and eleven, Fifty-fifth Congress, second session, twenty-five thousand dollars.

Bellingham, Wash.

Improving harbor at Bellingham, Washington: Continuing improvement in accordance with the report submitted in House Document Numbered Eleven hundred and sixty-one, Sixtieth Congress, second session, and sub-

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ject to the conditions relative to cooperation on the part of local interests as set forth in said document, fifteen thousand dollars.

Grays Harbor, Wash.

Improving Grays Harbor and Bar Entrance, Washington: Continuing improvement by means of extension of north jetty in accordance with the report of the Board of Engineers for Rivers and Harbors dated March first, nineteen hundred and ten, and printed in Rivers and Harbors Committee Document Numbered Twenty-nine, Sixty-first Congress, second session, seventy-five thousand dollars.

Inner portion and Chehalis River, Wash.

Improving Grays Harbor and Chehalis River, Washington: For maintenance of improvement of inner portion of Grays Harbor and Chehalis River, and continuing improvement of Chehalis River up to Montesano, in accordance with the report submitted in House Document Numbered Eleven hundred and twenty-five, Sixtieth Congress, second session, thirty-two thousand five hundred dollars.

Hammersley Inlet, Wash.

Improving Hammersley Inlet, Puget Sound, Washington: Completing improvement in accordance with the report submitted in House Document Numbered Two hundred and thirteen, Sixty-first Congress, second session, nine thousand dollars.

Olympia, Wash.

Improving harbor at Olympia, Washington: Continuing improvement in accordance with the report of the Board of Engineers for Rivers and Harbors dated March ninth, nineteen hundred and eight, and printed in Rivers and Harbors Committee Document Numbered Five, Sixty-first Congress, second session, and subject to the conditions relative to cooperation on the part of local interests as set forth in said document, fifteen thousand dollars.

Tacoma Harbor, Wash. Puyallup waterway contract terminated, etc. Vol. 33, p. 1144.

The Secretary of War is hereby authorized and directed to terminate the existing contract for work on the Puyallup waterway in Tacoma Harbor, Washington, and to suspend further work on the project for the improvement thereof, as recommended in the report of the Board of Engineers for Rivers and Harbors published in Senate Document Numbered Four hundred and eighteen, Sixty-first Congress, second session, until local interests shall divert the Puyallup River so it no longer empties into said waterway, or otherwise prevent excessive deposits therein from said river.

Columbia River, Wash. Wenatchee to Bridgeport.

Improving Columbia River between Wenatchee and Bridgeport, Washington: Continuing improvement, twenty-five thousand dollars.

Bridgeport to Kettle Falls.

Improving Columbia River between Bridgeport and Kettle Falls, Washington: Completing improvement in accordance with the report of the Board of Engineers for Rivers and Harbors dated March thirty-first, nineteen hundred and eight, and printed in Rivers and Harbors Committee Document Numbered Sixteen, Sixtieth Congress, second session, one hundred thousand dollars:

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Proviso. Use of State plant.

Provided, That the State of Washington shall furnish for the execution of the work the plant owned and employed by it on this section of the river.

Cowlitz and Lewis rivers, Wash.

Improving Cowlitz and Lewis rivers, Washington: Continuing improvement and for maintenance, including North Fork of Lewis River, and continuing improvement of Cowlitz River up to Toledo in accordance with reports submitted in House Documents Numbered Eleven hundred and sixty-seven, Sixtieth Congress, second session, and Four hundred and four, Sixty-first Congress, second session, respectively, thirty-four thousand one hundred dollars, two thousand five hundred dollars of which may be expended upon the Lewis River and the North Fork thereof.

Grays River, Wash.

Improving Grays River, Washington: For maintenance, five hundred dollars.

Puget Sound, Wash.

Improving Puget Sound, Washington: Continuing improvement and for maintenance of Puget Sound and its tributary waters, one hundred thousand dollars: *Provided*, That so much of said sum as may be necessary shall be expended in the completion of the sill across Hatt Slough.

Proviso. Hatt Slough.

Puget Sound-Lake Washington waterways. Lock at "The Narrows."

Puget Sound-Lake Washington waterway: Continuing improvement by the construction of a double lock, with the necessary accessory works, to be located at "The Narrows," at the entrance to Salmon Bay, in accordance with the project set forth in House Document Numbered Nine hundred and fifty-three, Sixtieth Congress, first session, one hundred and fifty thousand dollars; and the Secretary of War may enter into a contract or contracts for such material and work as may be necessary to complete said lock and accessory works, to be paid for as funds may be provided from time to time by law, not to exceed in the aggregate two million two hundred and seventy-five thousand dollars, including the amount herein appropriated: *Provided*, That before beginning said work, or making such contract or contracts, the Secretary of War shall be satisfied that King County, or some other local agency, will do the excavation in the waterway above the lock to the dimensions recommended in said project, and will also secure the United States from liability for any claims or damages on account of the grant made to James A. Moore or his assigns by the Act of Congress approved June eleventh, nineteen hundred and six, or on account of the lowering of the level of Lake Washington, raising the level of Salmon Bay, or any other alteration of the level of any part of said waterway.

Contracts.

Proviso. Excavation by King County.

Damages to James A. Moore. Vol. 34, pp. 231, 1108; Vol. 35, p. 613.

Puget Sound waterway to lakes Union and Washington.

Improving waterway connecting Puget Sound with lakes Union and Washington: For maintenance of improvement, five thousand dollars.

Skagit River, Wash.

Improving Skagit River, Washington: Completing improvement in accordance with the report submitted in House Document Numbered Eleven hundred and eighty-

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eight, Sixtieth Congress, second session, one hundred thousand dollars.

Snohomish River, Wash.

Improving Snohomish River, Washington, in accordance with the report submitted in House Document Numbered Eleven hundred and eight, Sixtieth Congress, second session, twenty-five thousand dollars.

Swinomish Slough.

Improving Swinomish Slough, Washington: For maintenance, ten thousand dollars.

Willapa River and Harbor, Wash.

Improving Willapa River and Harbor, Washington: For maintenance, and continuing improvement in accordance with the report submitted in House Document Numbered Five hundred and twenty-four, Sixty-first Congress, second session, and subject to the conditions relative to cooperation on the part of local interests as set forth in said document, fifty thousand dollars.

Flathead Lake, Mont. Polson Bay.

Improving Polson Bay, Flathead Lake, Montana: Completing improvement in accordance with the report submitted in House Document Numbered Six hundred and forty-five, Sixty-first Congress, second session, six thousand dollars.

Saint Michael Canal, Alaska.

Improving Saint Michael Canal, Alaska: Completing improvement in accordance with the report submitted in Senate Document Numbered Four hundred and sixteen, Sixty-first Congress, second session, one hundred and forty-three thousand dollars.

Hilo, Hawaii.

Improving harbor at Hilo, Hawaii: Continuing improvement, two hundred thousand dollars.

Honolulu, Hawaii.

Improving harbor at Honolulu, Hawaii: Continuing improvement and for maintenance, one hundred and fifty thousand dollars.

Kahului Harbor, Hawaii.

Improving Kahului Harbor, Hawaii, in accordance with the report submitted in House Document Numbered Five hundred and ninety-three, Sixty-first Congress, second session, and subject to the conditions set forth in said document, one hundred and fifty thousand dollars.

San Juan, P. R.

Improving harbor at San Juan, Porto Rico: For maintenance, twenty thousand dollars.

Navigation Congresses. Meeting of International Association in United States.

For the necessary expenses of the proposed meeting in the United States of the Permanent International Association of Navigation Congresses, including the publication of the proceedings, the necessary expenses of the American delegates, and the cost of transporting foreign members of the Permanent International Association of Navigation Congresses and authorized foreign delegates in the investigation of American waterways, fifty thousand dollars; and the Secretary of State is hereby requested to extend an official invitation to such association to visit the United States for such purpose.

Invitation.

John H. Bankhead. Services on Inland Waterways Commission.

The sum of one thousand eight hundred and seventy-five dollars be, and the same is hereby, appropriated to be paid to John H. Bankhead, of Alabama, for his services on the Inland Waterways Commission from the fourteenth day of March to the eighteenth day of June, nineteen hundred and seven.

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Emergencies. For emergencies: To provide for the restoration of channels, or river and harbor improvements heretofore established or made by the Government, or herein provided for, where by reason of emergency occurring after the passage of this Act the usual depth of such channels or customary use of such improvement can not be maintained, and there is no sufficient fund available for such restoration, three hundred thousand dollars. The amount herein provided shall be allotted by the Secretary of War: *Provided*, That in no case shall such allotment be made unless recommended by the local engineer having such channel or improvement in charge, and by the Chief of Engineers, respectively: *Provided further*, That for no single channel or improvement shall a sum greater than ten thousand dollars be allotted, nor any portion of the said appropriation, unless the same is necessary in the interest of navigation or to protect and preserve existing government work in the interest of navigation.

Allotment.

Provisos. Recommendations required.

Limit.

Depth of waters defined. The depth of water in tidal waters, as well as in rivers and nontidal channels, whenever referred to in this Act shall be understood to mean the depth at mean low water unless otherwise expressed.

Maintenance, etc., of existing works. Appropriations made for the respective works herein named, or so much thereof as may be necessary, may, in the discretion of the Secretary of War, be used for maintenance and for the repair and restoration of said works whenever from any cause they have become seriously impaired, as well as for the further improvement of said works.

Surveys, etc., paid from amount for project. Surveys and examinations provided for in this section shall, unless otherwise expressed, be paid for from the appropriations made for the respective improvements or projects to which they pertain, or in connection with which they are mentioned.

Contracts, etc., for works. All works of improvement herein or hereafter authorized to be prosecuted or completed under contracts may, in the discretion of the Secretary of War, be carried on by contract or otherwise, as may be most economical or advantageous to the United States.

Allotment of consolidated works. Where separate works or items are consolidated in this Act and an aggregate amount is appropriated therefor, the amounts herein appropriated shall, unless otherwise expressed, be expended in securing maintenance and improvement according to the respective projects herein or heretofore adopted by Congress, after giving due regard to the respective needs of traffic. The allotments to the respective works herein consolidated shall be made by the Secretary of War upon recommendations by the Chief of Engineers. In case such works or items are consolidated and separate amounts are given with each project, the amounts so named shall be expended upon such separate projects unless, in the discretion of the Secretary of War, another allotment or division should be made of the same.

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Any balances now remaining to the credit of the consolidated items in this Act shall be carried to the credit of the respective aggregate amounts appropriated for the consolidated items herein contained. Balances carried to authorized works.

In the collection of statistics relating to traffic, the Corps of Engineers is directed to adopt a uniform system of classification for freight, and upon rivers or inland waterways to collate ton-mileage statistics as far as practicable. Classification of traffic statistics.

SEC. 2. Whenever the appropriations made by Congress for river and harbor works can be more advantageously expended by combining in one contract two or more works, such combinations shall be made; and whenever the appropriations made, or authorized to be made, for the completion of any such work shall prove insufficient therefor, the Secretary of War may, in his discretion, on the recommendation of the Chief of Engineers, apply the funds so appropriated, or authorized, to the prosecution of such work. Combining contracts. Insufficient appropriations.

SEC. 3. That for examinations, surveys, and contingencies for rivers and harbors for which there may be no special appropriation, the sum of five hundred thousand dollars is hereby appropriated: *Provided*, That no preliminary examination, survey, project, or estimate for new works other than those designated in this or some prior Act or joint resolution shall be made: *Provided further*, That after the regular or formal reports made as required by law on any examination, survey, project, or work under way or proposed are submitted no supplemental or additional report or estimate shall be made unless ordered by a concurrent resolution of Congress. The Government shall not be deemed to have entered upon any project for the improvement of any waterway or harbor mentioned in this Act until funds for the commencement of the proposed work shall have been actually appropiated by law. Appropriation for examinations, etc. *Provisos.* Authority required. Supplementary reports restricted. Special authority to begin work.

The Secretary of War is hereby authorized and directed to cause preliminary examinations and surveys to be made at the localities named in this section, as hereinafter set forth, and a sufficient sum to pay the cost thereof may be allotted from the amount appropriated in this section. In all cases a preliminary examination of the river, harbor, or other proposed improvement mentioned shall first be made, and a report as to the advisability of its improvement shall be submitted, unless a survey or estimate is herein expressly directed. If upon such preliminary examination the proposed improvement is not deemed advisable, no further action shall be taken thereon without the further direction of Congress; but in case the report shall be favorable to such proposed improvement, or that a survey and estimate should be made to determine the advisability of improvement, the Secretary Allotment of preliminary examinations, etc. Report of examination. Unfavorable reports. Survey, etc., if favorable.

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of War is hereby authorized, in his discretion, to cause surveys to be made, and the cost and advisability to be reported to Congress. And such reports containing plans and estimates shall also contain a statement as to the rate at which the work should be prosecuted. Such examinations and surveys shall be reviewed by the Board of Engineers for Rivers and Harbors, as provided in section three of the river and harbor Act of March second, nineteen hundred and seven: *Provided*, That every examination and survey report submitted to Congress, as provided for herein or as may be provided for hereafter, in addition to full information regarding the present and prospective commercial importance of the project covered by the report, and the benefit to commerce likely to result from any proposed plan of improvement, shall contain also such data as it may be practicable to secure regarding (first) the establishment of terminal and transfer facilities, (second) the development and utilization of water power for industrial and commercial purposes, and (third) such other subjects as may be properly connected with such project: *Provided further*, That in the investigation and study of these questions consideration shall be given only to their bearing upon the improvement of navigation and to the possibility and desirability of their being coordinated in a logical and proper manner with improvements for navigation to lessen the cost of such improvements and to compensate the Government for expenditures made in the interest of navigation: *And provided further*, That the investigation and study of these questions as provided herein may, upon review by the Board of Engineers for Rivers and Harbors when called for as now provided by law, be extended to any work of improvement now under way and to any locality the examination and survey of which has heretofore been, or may hereafter be, authorized by Congress.

Requirements.

Review by Board of Engineers.

Provisos.
Additional information required.

Terminal facilities.
Water transfers, etc.

Coordination with navigation necessary.

Extension of existing works.

Examination of watersheds, etc., of navigable streams.

The surveys of navigable streams herein or hereafter authorized shall include such stream-flow measurements and other investigations of the watersheds as may be necessary for preparation of plans of improvement and a proper consideration of all uses of the stream affecting navigation, and whenever necessary similar investigations may be made in connection with all navigable streams under improvement. Whenever permission for the construction of dams in navigable streams is granted, or is under consideration by Congress, such surveys and investigations of the sections of the streams affected may be made as are necessary to secure conformity with rational plans for the improvement of the streams for navigation.

Report on dams, etc.

Printing preliminary examinations, etc., during recess.
Examinations ordered.

All reports of preliminary examinations and surveys which may be prepared during the recess of Congress shall, in the discretion of the Secretary of War, be printed by the Public Printer as documents of the following session of Congress.

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ALABAMA AND FLORIDA. Alabama and Florida.

Escambia and Conecuh rivers up to Brewton.

ARKANSAS. Arkansas.

Saint Francis River, from its mouth to the mouth of L'Anguille River and L'Anguille River from its mouth to the city of Marianna.

White River, at and near Devall Bluff, with a view to improvement for navigation and the revetment of the banks in cooperation with local interests.

ARKANSAS AND TEXAS. Arkansas and Texas.

Channel connecting Red and Sulphur rivers by way of Texarkana.

CALIFORNIA. California.

Long Beach Harbor.

Los Angeles (San Pedro) Outer Harbor, with a view to obtaining an increased depth.

CONNECTICUT. Connecticut.

Bridgeport Harbor, with a view to protecting the channels from the erosion of Long Beach.

Cove Harbor, with a view to providing an entrance channel of increased depth.

Darien River.

Thames River, west channel, from Poquetanuck drawbridge to Kiteamaug, for fourteen-foot channel.

New Haven Harbor, with a view to improving the channel by way of Oyster Point to the bridge of the New York, New Haven and Hartford Railroad Company, on West River.

East Haven River.

FLORIDA. Florida.

Apalachicola Bay and Saint George Sound, with a view to determining the best location for a deep-water harbor with entrance channel from the Gulf of Mexico by way of East Pass, West Pass, New Inlet, or by an artificial cut across Saint George Island, consideration being given to the respective needs of the cities of Apalachicola and Carrabelle for increased harbor facilities.

Choctawhatchee Bay, with a view to securing a deeper channel to the Gulf of Mexico.

Chipola River.

Withlacoochee River from Port Inglis to Panasoffkee.

Oklawaha River to Lake Dora.

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Channel from Saint Johns River through Lake Dexter, thence to Lake Woodruff, thence to Saint Johns River below Hawkinsville.

Saint Johns River from Jacksonville to Palatka, with a view to securing increased depth.

Saint Joseph Bay, with a view to securing increased depth at the entrance thereto.

Charlotte Harbor, with a view to securing a channel of increased depth from the Gulf of Mexico to Punta Gorda.

Key West Harbor, channels leading thereto.

Jupiter Inlet.

Gilberts Bar.

Lake Crescent and Dunns Creek, Florida, from the Saint Johns River to Crescent City.

Lemon Bay to Gasparilla Sound.

Biscayne Bay, with a view to providing a channel twenty feet deep and three hundred feet wide through the entrance and a channel of the same depth one hundred and fifty feet wide through the bay to the mouth of Miami River.

Kissimmee and Caloosahatchee rivers and Lake Okechobee and tributaries, with a view to adopting a plan of improvement of said waters which will harmonize as nearly as may be practicable with the general scheme of the State of Florida for the drainage of the Everglades.

Georgia.

GEORGIA.

Darien Harbor, with a view to securing a depth of eighteen feet across the bar.

Waterways from Louisville to Savannah, including cut-off or canal from Ogeechee River to Savannah River or Harbor with a view to providing a more direct route between said cities than that afforded by existing channels.

Cow Head River, from Lazaretto Creek to Tybee Creek, with a view to securing increased depth.

Frederica River, at or near Fort Frederica.

Savannah River and Harbor, for two miles above the upper limits of the city of Savannah, with a view to securing improved navigation.

Altamaha River.

Satilla River, above Burnt Fort.

Hawaii.

HAWAII.

Harbors of the island of Kauai, with a view to determining the best location for a port.

Illinois.

ILLINOIS.

Illinois River, between Hurricane Island and Calhoun County, for the purpose of providing a suitable channel.

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Mississippi River, opposite Thomas Landing, in Calhoun County, for the purpose of providing a suitable channel.

Mississippi River, opposite the City of Saint Louis, from the south end of Cabaret Island to the north end of Arsenal Island, for the purpose of providing a suitable channel by revetment of the bank.

West Branch, South fork, Chicago River, from Robey street west to Forty-eighth avenue, with a view to securing a channel twenty-one feet deep and one hundred and seventy-five feet wide, except through rock cutting it shall be one hundred feet wide.

INDIANA AND ILLINOIS. Indiana and Illinois.

Wabash River, from its mouth to Terre Haute, with special report as to improving said river up to Mount Carmel by dredging.

KENTUCKY. Kentucky.

Green River, with a view to an extension of the present system of locks and dams.

LOUISIANA. Louisiana.

Abita River, from Abita Springs to Bogue Falia.

Bayou Grossetete, from its source to Bayou Plaquemine.

LOUISIANA AND MISSISSIPPI. Louisiana and Mississippi.

Amite River, from the mouth of Bayou Manchac to a point west of the town of Liberty, in Amite County, Mississippi.

MAINE. Maine.

Portland Harbor.

Boothbay Harbor.

Chandlers River, with a view to its improvement by dredging from its mouth to Jonesboro.

Kennebunk River.

South Bristol Harbor, with a view to a channel thirty feet wide and twelve feet deep through the drawbridge.

New Meadows River.

Ogunquit Harbor.

Bass Harbor Bar and Deer Island Thoroughfare.

Corea Harbor, Gouldsboro.

Camden Harbor, with a view to constructing a breakwater from the mainland to Negro Island.

Medomak River.

Northeast Harbor, Mount Desert.

MARYLAND. Maryland.

Broad Creek, a waterway connecting Pocomoke Sound and Little Annemessex River.

Tilghman Island Harbor, with a view to securing increased depth.

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Northeast River from its mouth to the town of North East.

Tred Avon River, with a view to securing increased width of channel from Easton Point to the mouth of Peach Blossom Creek.

Slaughter Creek, with a view to removing the bar at the mouth.

Winchester Harbor.

Saint Martins River in Worcester County.

Sinepuxent Bay, with a view to a channel five feet in depth from the mouth of Saint Martins River south.

Twitch Cove and Big Thoroughfare River connecting Tylers River with Tangier Sound, in Chesapeake Bay.

Massachusetts.

MASSACHUSETTS.

Harbor at New Bedford and Fair Haven, with a view to extending the channel to Belleville.

Malden River.

Boston Harbor, with a view to securing increased depth in South Bay; Chelsea Creek between the Meridian Street Bridge and the old East Boston Bridge, and the south channel of Mystic River.

Salem Harbor, with a view to removing a shoal in the outer harbor of Salem and Beverly.

Weymouth Fore River, below the Quincy Point Bridge, with a view to straightening and improving the channel.

Plymouth Harbor.

Michigan.

MICHIGAN.

Saint Marys River at the Falls, with a view to the construction of an additional lock.

Keweenaw Waterway, with a view to enlarging the stilling basin at the west end, and increasing size of harbor of refuge.

Manistee Harbor, with a view to securing a channel not less than twenty feet deep from Lake Michigan to Lake Manistee, and the enlargement of the outer harbor, including the construction of a new south pier.

ARCADIA HARBOR [SIC].

Detroit River, Wyandotte Channel, lying between Fighting Island and the City of Wyandotte, with a view to straightening the channel.

Saint Marys River, with a view to the removal of shoals and reefs near Detour.

Minnesota.

MINNESOTA.

Harbor at Knife River.

Rainy River, with a view to removing obstructions in the channel at Rainier.

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Mississippi River, with a view to the removal of a ledge in Aitkin County at or near Pine Knoll.
Harbor and channel at Saint Paul.
Saint Croix River at Afton.
Mississippi River, between Winnibigoshish and Pokegama reservoirs; and from Leech Lake dam to the mouth of Leech River, with a view to straightening and improving the channel.

MINNESOTA AND NORTH DAKOTA. Minnesota and North Dakota.

Red River of the North and its headwaters in Minnesota and North Dakota, with a view to determining whether storage reservoirs are necessary in the interest of navigation.

MINNESOTA AND WISCONSIN. Minnesota and Wisconsin.

Saint Louis River, from the head of the present project near the north end of Spirit Lake up to New Duluth, and from thence up to the stone quarries near Fond du Lac.

MISSISSIPPI. Mississippi.

Big Black River, from its mouth to the town of West.
Quiver River.
Yalobusha River, to the town of Derma.
Mouth of Pascagoula River, with a view to securing increased depth in a continuous channel from the upper limits of the present project in Dog River to deep water in the Gulf of Mexico.

MISSOURI. Missouri.

Gasconade River from Gascondy to Arlington.

NEBRASKA. Nebraska.

Missouri River near Omaha, South Omaha, Florence, and Dundee, with a view to improvement for navigation and protection of the banks in cooperation with local interests.
Missouri River at some point or points between Omaha and the mouth of the Platte River, with a view to determining by trial the practicability of the cable and sand plan for the protection of the channel and banks of the river.

NEW JERSEY. New Jersey.

Newark Bay and Passaic and Hackensack rivers, with a view to securing channel depths of twenty and twenty-five feet from Kill van Kull to the bridges of the Newark and New York Railroad over said rivers; a depth of twenty feet up the Passaic River, first to Center street

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in the city of Newark, and the second to the Nairn Linoleum Works, and a suitable depth from the last-named point to the city of Passaic.

Ship canal with depths of thirty and thirty-five feet extending from a point in the city of Newark, below the junction of the Pennsylvania and Lehigh Valley railroads through the Newark Meadows and Newark Bay to deep water of the Kill van Kull.

Woodbury Creek.

Absecon Creek.

Cooper Creek, with a view to an increased depth and an extension of the project.

Elizabeth River, with a view to providing a channel of sufficient depth from the Broad street bridge to the channel in Staten Island Sound.

South River, with a view of deepening the channel between South River and Old Bridge to a depth of six feet.

Delaware River, with a view to connecting the landing at Bordentown with the main channel.

Raritan River, including a widening of the channel from the mill or Martins Creek to Martins Dock on the north side.

Absecon Inlet, with a view to improving and maintaining the channel.

Pensauken Creek.

New York.

NEW YORK.

Great Sodus Bay.

Harbor at Port Henry.

Great Kills Harbor, with a view to securing increased anchorage area.

Buffalo Harbor, with a view to securing increased depth in the outer harbor and entrances thereto.

Sag Harbor, with a view to securing increased anchorage area and protecting the channel between said harbor and Gardiners Bay from the erosion of Cedar Point.

Olcott Harbor, with a view to securing increased depth.

Hudson River, with a view to securing increased depth.

Niagara River, with a view to securing a depth of eighteen feet from Black Rock Harbor to the foot of Sugar street in the city of Niagara Falls by way of the channel on the east side of Grand Island; also between the points named above by way of the channel on the west side of Grand Island between said island and Navy Island.

Bronx River.

Lemon Creek.

Little Neck Bay.

Manhasset Harbor.

Mount Sinai Harbor.

Hudson River at Ossining.

Milton Harbor and Mill Creek.

Larchmont Harbor.

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New York Harbor, with a view to determining whether additional channel width and depth are necessary in the North or Hudson River.

NEW YORK AND VERMONT. New York and Vermont.

Narrows of Lake Champlain.

NORTH CAROLINA. North Carolina.

Cape Lookout Harbor, with a view to determining its availability and adaptability as a commercial harbor.

Core Creek, with a view to the improvement of navigation up to Core Creek landing.

Scuppernong River to the town of Cherry.

Edenton Bay.

Harbor of Belhaven, and entrance thereto.

Slades Creek.

Channel from Core Sound to Newport River, by way of Taylors Creek or Carrot Island Slough.

Elizabeth River.

Fishing Creek.

French Broad River.

Shallotte River.

OHIO. Ohio.

Cuyahoga River, from its mouth to a more southerly connection with the Ohio Canal, with a view to eliminating bends and securing a navigable depth of twenty-one feet, with suitable width; with a report on any proposition for cooperation by localities affected thereby.

Sandusky River, from its mouth to Fremont, with a view to securing a navigable depth of ten feet, with suitable width.

Vermilion Harbor, with a view to securing additional width of harbor entrance.

Sandusky Harbor.

OHIO AND INDIANA. Ohio and Indiana.

Maumee River, from Toledo to Fort Wayne.

OREGON. Oregon.

Coos Bay and entrance, including the removal of Guano Rock.

Umpqua River, from Scottsburg to Roseburg.

Oregon Slough, branch of Columbia River, opposite Vancouver, Washington.

Willamette River, between Portland and Oregon City.

Tillamook Bay and bar, with a view to securing a channel with a depth of fifteen feet and twenty feet, respectively; with a report on any proposition for cooperation by localities affected thereby.

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North Fork of Coquille River, for a distance of seventeen miles up the stream from the mouth.

East Fork of Coquille River, for a distance of eight miles up the stream from the mouth.

Pennsylvania.

PENNSYLVANIA.

Frankford Creek.

Ridley River.

Chester River.

Darby River.

Porto Rico.

PORTO RICO.

Palmas Atlas Harbor.

Rhode Island.

RHODE ISLAND.

Sakonnet Harbor.

South Carolina.

SOUTH CAROLINA.

Waterways from Orangeburg to Charleston, including cut-off or canal from Edisto River to Ashley River with a view to providing a more direct route between said cities than that afforded by existing channels.

Waterways from Columbia and Camden to Charleston, including cut-off or canal from Santee River by any existing or proposed route to Cooper River or Wando River and any of their tributaries with a view to providing a more direct route between said cities than that afforded by existing waterways.

Great Pedee River, at Gibson Dam, with a view to aiding navigation.

Salkehatchie River to Morris Crossing.

South Fork Edisto River to Guignards Landing.

Harbor at Charleston, with a view to securing a depth of thirty feet.

Archers Creek.

Texas.

TEXAS.

Old (Trinity) River, in Chambers County, with a view to securing increased depth.

Pilkington Bayou.

Tres Palacios River.

Aransas Pass and tributary waters, including channels to Corpus Christi, Rockport, Aransas Pass, and to the mainland at any available point, with a view to determining the best location for a deep-water harbor or port. Said examination and report to be made by a board of five engineers, to be appointed by the Secretary of War.

Sabine River, as far as practicable above Orange.

Brazos River, with a view to preventing a cut-off at Jupiters Cut.

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TEXAS AND OKLAHOMA. Texas and Oklahoma.

Red River, from the mouth of the Washita River to the mouth of the Big Wichita River.

VIRGINIA. Virginia.

Willis River.

Archers Hope River, with a view to securing increased depth from its mouth to Williamsburg.

Aquia Creek from Coals Landing to the mouth.

Newport News Creek, with a view to securing a depth of eight feet.

Pagan River, with a view to securing a depth of twelve feet, and a turning basin at Smithfield.

WASHINGTON. Washington.

Skagit River, from Sedro-Woolley to Baker.

Sammamish River.

Duwamish River.

Hoquiam River.

Dabob River.

Stilaguamish River.

East and west waterways in Seattle Harbor, with view to maintenance by United States Government.

Edmonds Harbor.

For a ship canal between Port Townsend Bay, Puget Sound, and Oak Harbor.

Harbor of refuge at Neah Bay, or at such other point in the vicinity thereof as will best subserve the interests of commerce and navigation.

WEST VIRGINIA. West Virginia.

Deckers Creek, with a view to securing for a distance of two thousand five hundred feet up from its mouth a channel and harbor with the same depth of water as in the Monongahela River where said Deckers Creek empties into said river.

WISCONSIN. Wisconsin.

Detroit Harbor.

Two Rivers, with a view to the further improvement of said harbor by the construction of a south stilling basin, or otherwise.

Waupaca River, from its mouth to Weyauwega.

SEC. 4. That whenever any vessel belonging to or employed by the United States engaged upon river and harbor work collides with and damages another vessel, pier, or other legal structure belonging to any person or corporation, the Chief of Engineers shall cause an immediate and thorough examination to be made, and, if in his judgment, the facts and circumstances of the collision Injuries by vessels on river and harbor works.

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are such as to make the whole or any part of the damage inflicted a proper charge against the United States, the Chief of Engineers, subject to the approval of the Secretary of War, shall have authority to adjust and settle all claims for damages caused by such collision in cases where the claim for damage does not exceed five hundred dollars, and report the same to Congress for consideration.

Adjustment of claims.

Temporary leases allowed. R. S., sec. 3744, p. 738.

SEC. 5. That the requirements of section thirty-seven hundred and forty-four of the Revised Statutes shall not apply to the lease of lands, or easements therein, or of buildings, rooms, wharves, or rights of wharfage or dockage, or to the hire of vessels, boats, and other floating craft, for use in connection with river and harbor improvements, where the period of any such lease or hire is not to exceed three months.

Approved, June 25, 1910.

June 25, 1910. [H. R. 26987.] [Public, No. 265.]

CHAP. 383.—An Act To increase the limit of cost of certain public buildings, to authorize the enlargement, extension, remodeling, or improvement of certain public buildings, to authorize the erection and completion of public buildings, to authorize the purchase of sites for public buildings, and for other purposes.

Public buildings, omnibus act.

Limits of cost increased and contracts authorized.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That to enable the Secretary of the Treasury of the United States to give effect to and execute the provisions of existing legislation authorizing the acquisition of land for sites or the enlargement thereof, and the erection, enlargement, extension, remodeling, or repair of public buildings in the several cities hereinafter enumerated, the limit of cost heretofore fixed by Congress therefor be, and the same is hereby, increased, respectively, as follows, and the Secretary of the Treasury is hereby authorized to enter into contracts for the completion of each of said buildings within its respective limit of cost, including site: .

* * * * *

Point Pleasant, W. Va. Limit of cost increased. Vol. 35, p. 582.

SEC. 12. That the limit of cost heretofore fixed in section thirty-two of "An Act to increase the limit of cost of certain public buildings, to authorize the enlargement, extension, remodeling, or improvement of certain public buildings, and so forth," approved May thirtieth, nineteen hundred and eight, for the erection and completion of a memorial structure at Point Pleasant, West Virginia, be, and the same is hereby, increased from ten thousand dollars to fifteen thousand dollars.

* * * * *

Meridian Hill Park, D. C. Purchase of land authorized.

SEC. 36. That the Secretary of the Interior be, and he is hereby, directed to acquire, by purchase or condemnation, for the purpose of providing a reservation for a public park, the several parcels of ground in the District

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of Columbia included between Euclid street, Columbia avenue or Fifteenth street, W street or Florida avenue, and Sixteenth street extended, in Hall and Elvan's subdivision of Meridian Hill, containing in the aggregate four hundred and thirty-seven thousand square feet, more or less; and to pay for the said land and premises so taken, and the improvements thereon, the sum of four hundred and ninety thousand dollars, or so much thereof as may be necessary, which sum is hereby authorized out of any money in the Treasury of the United States not otherwise appropriated: * * *

Appropriation authorized.

* * * * * *

That the public park authorized and established by this Act shall become a part of the park system of the District of Columbia and be under the control of the Chief of Engineers of the United States Army.

Control, etc.

SEC. 37. That the Commissioners of the District of Columbia be, and they are hereby, authorized and directed to acquire for a park, by purchase or condemnation, the tract of land known as Montrose, lying immediately north of Road or R street and east of Lovers lane, on Georgetown Heights, containing sixteen acres, more or less, at an expense not exceeding one hundred and fifty thousand dollars; and for that purpose the sum of one hundred and fifty thousand dollars is hereby authorized, payable one-half out of the revenues of the District of Columbia and one-half out of any money in the Treasury not otherwise appropriated: *Provided*, That one-half of the said sum of one hundred and fifty thousand dollars, or so much thereof as may be expended, shall be reimbursed to the Treasury of the United States out of the revenues of the District of Columbia, in four equal annual installments, with interest at the rate of three per centum per annum upon the deferred payments: *And provided further*, That one-half of the sum that shall be annually appropriated and expended for the maintenance and improvement of said lands as a public park shall be charged against and paid out of the revenues of the District of Columbia, in the same manner now provided by law in respect to other appropriations for the District of Columbia, and the other half shall be appropriated out of the Treasury of the United States. If said commissioners shall be unable to purchase said land at a price not exceeding the sum of one hundred and fifty thousand dollars, then they shall proceed to acquire said land in the manner prescribed for providing a site for an addition to the Government Printing Office in so much of the Act approved July first, eighteen hundred and ninety-eight, as is set forth on pages six hundred and forty-eight and six hundred and forty-nine of volume thirty of the Statutes at Large, and for the purpose of said acquisition the Commissioners of the District of Columbia shall have and exercise all powers conferred upon the Public Printer in

Montrose Park, D. C.
Purchase of land on Georgetown Heights authorized.

Appropriation authorized.

Provisos.
Half from District revenues.

Maintenance, etc.

Condemnation proceedings.

Vol. 30, p. 649.

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Control, etc.

said Act: *Provided*, That the public park authorized and established by this Act shall become a part of the park system of the District of Columbia and be under the control of the Chief of Engineers of the United States Army.

* * * * *

Right to alter, etc.

SEC. 43. That Congress reserves the right to alter, amend, or repeal this Act.

Conflicting laws repealed.

SEC. 44. That all Acts or parts of Acts in conflict herewith are hereby repealed.

Approved, June 25, 1910.

June 25, 1910.
[H. R. 25552.]
[Public, No. 266.]

CHAP. 384.—An Act Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, nineteen hundred and eleven, and for other purposes.

Sundry civil expenses, appropriations.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums be, and the same are hereby, appropriated, for the objects hereinafter expressed, for the fiscal year ending June thirtieth, nineteen hundred and eleven, namely:

* * * * *

District of Columbia.

DISTRICT OF COLUMBIA.

Naval militia storehouse.

For construction, on lands owned by the United States, of storehouse for naval battalion of the militia of the District of Columbia, twenty thousand dollars, one half of which sum shall be paid out of the revenues of the District of Columbia and the other half out of the Treasury of the United States.

McMillan Park.
Site, etc., for memorial fountain.

For the preparation of the site, approaches, walks, foundation, and piping for the fountain to be erected in McMillan Park, in the District of Columbia, by the James McMillan Memorial Association of Michigan, fifteen thousand dollars.

Public convenience stations.
Dupont Circle, revoked.
Vol. 35, p. 701.

The authority granted in the District of Columbia appropriation Act for the fiscal year nineteen hundred and ten, approved March third, nineteen hundred and nine, for the construction of a public convenience station on the triangle west of Dupont Circle, between Twentieth and P streets and Massachusetts avenue, is hereby revoked, and the Commissioners of the District of Columbia are authorized to enter into a supplemental agreement with the contractor for erecting said convenience station, providing for the abandonment of further work of construction, for removing construction work already done, and for restoring said triangle to the condition which existed prior to the beginning of said station, including, in the discretion of said commisssioners, the purchase from the contractor of any or all materials intended for the construction of said station, which material, if purchased,

Removal of work done, etc.

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may be used in other construction work by said commissioners; and any balance then remaining of the appropriation for said station shall be covered into the United States Treasury, one half to the credit of the revenues of the District of Columbia and the other half to the credit of the United States.

Ninth street, between F and G, revoked. Vol. 35, p. 701.

Further work on the public convenience station appropriated for in the District of Columbia appropriation Act for the fiscal year nineteen hundred and ten, approved March third, nineteen hundred and nine, to be located under the sidewalk on the east side of Ninth street northwest, between F and G streets, is hereby suspended, and the unexpended balance of the appropriation therefor is hereby covered into the Treasury, one-half to the credit of the United States and one-half to the credit of the District of Columbia.

* * * * *

UNDER THE WAR DEPARTMENT.

War Department.

* * * * *

UNDER QUARTERMASTER'S DEPARTMENT.

Quartermaster's Department.

* * * * *

Brig. Gen. James Shields. Monument, Carrollton, Mo. Private Laws, p. 137.

For the erection of a monument over the grave of Brigadier-General James Shields in Saint Mary's Cemetery, at Carrollton, Missouri, as authorized by the Act approved March fifteenth, nineteen hundred and ten, three thousand dollars.

* * * * *

UNDER ENGINEER DEPARTMENT.

Yellowstone.

YELLOWSTONE NATIONAL PARK: For maintenance and repair of improvements, including twenty thousand dollars for improvement of the roads leading into the park from the eastern and southern boundaries, seventy-five thousand dollars, to be expended by and under the direction of the Secretary of War; and to be immediately available: *Provided*, That no portion of this appropriation shall be expended for the removal of snow from the roads for the purpose of opening them in advance of the time when they will be cleared by seasonal changes.

Proviso. Restriction.

Mount Rainier.

MOUNT RAINIER NATIONAL PARK: For additional work upon the wagon road into said park from the west, heretofore surveyed and commenced, under the direction of the Secretary of War, to be immediately available, twenty-five thousand dollars.

Crater Lake.

CRATER LAKE NATIONAL PARK: For surveying, locating and preparing plans and estimates for roads and trails in Crater Lake National Park, Oregon, and to cover

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all expenses incident thereto, to be expended under the direction of the Secretary of War, ten thousand dollars.

Buildings and grounds, District of Columbia.

BUILDINGS AND GROUNDS IN AND AROUND WASHINGTON: For improvement and care of public grounds, District of Columbia, as follows:

Improvement and care.

For improvement and maintenance of grounds south of Executive Mansion, four thousand dollars.

For ordinary care of greenhouses and nursery, two thousand dollars.

For repair and reconstruction of the greenhouses at the nursery, three thousand dollars.

For ordinary care of Lafayette Park, two thousand dollars.

For ordinary care of Franklin Park, one thousand five hundred dollars.

For improvement and ordinary care of Lincoln Park, two thousand dollars.

Monument grounds.

For care and improvement of Monument grounds and annex (Potomac Park) to Monument grounds, seven thousand dollars.

For improvement, care, and maintenance of Garfield Park, two thousand five hundred dollars.

For construction and repair of post-and-chain fences, repair of high iron fences, constructing stone coping about reservations, painting watchmen's lodges, iron fences, vases, lamps, and lamp-posts; repairing and extending water pipes, and apparatus for cleaning them; hose; manure, and hauling the same; removing snow and ice; purchase and repair of seats and tools; trees, tree and plant stakes, labels, lime, whitewashing, and stock for nursery, flower pots, twine, baskets, wire, splints, moss, and lycopodium, to be purchased by contract or otherwise, as the Secretary of War may determine; care, construction, and repair of fountains; abating nuisances, cleaning statues, and repairing pedestals, eighteen thousand five hundred and fifty dollars.

For improvement, care, and maintenance of various reservations, including purchase, maintenance, and driving of horse and vehicle for official use of the officer in charge of public buildings and grounds, and of other necessary vehicles, for official use twenty-six thousand dollars.

For improvement, care, and maintenance of Smithsonian grounds, three thousand dollars.

For improvement and maintenance of Judiciary Park, two thousand five hundred dollars.

For laying cement and other walks in various reservations, two thousand dollars.

For broken-stone road covering for parks, three thousand five hundred dollars.

For curbing, coping, and flagging for park roads and walks, two thousand dollars.

Potomac Park.

For care and maintenance of Potomac Park, fifteen thousand dollars.

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For completing the southern half of north B street from Virginia avenue eastward to Fifteenth street west as a park roadway according to plans prepared in the office of public buildings and grounds, to be expended under the direction of the officer in charge of that office, five thousand dollars.

For grading, soiling, seeding, and planting that portion of Potomac Park between the tidal basin and B street north, twenty-five thousand dollars.

For oiling macadam roads, five thousand dollars.

Half from District revenues.

One half of the foregoing sums under "Buildings and grounds in and around Washington" shall be paid from the revenues of the District of Columbia and the other half from the Treasury of the United States.

Limit for concrete, etc., pavements.

Under appropriations herein contained no contract shall be made for making or repairing concrete or asphalt pavements in Washington City at a higher price than one dollar and eighty-five cents per square yard for a quality equal to the best laid in the District of Columbia prior to July first, eighteen hundred and eighty-six, and with a base of not less than six inches in thickness.

For improvement, care, and maintenance of grounds of executive departments, one thousand dollars.

For such trees, shrubs, plants, fertilizers, and skilled labor for the grounds of the Library of Congress as may be requested by the superintendent of the Library building, one thousand dollars.

For such trees, shrubs, plants, fertilizers, and skilled labor for the grounds of the Capitol and House Office Building as may be requested by the superintendent of the Capitol building, three thousand dollars.

Executive Mansion grounds.

For improvement and maintenance of Executive Mansion grounds (within iron fence), four thousand dollars.

For the employment of an engineer by the officer in charge of public buildings and grounds, two thousand four hundred dollars.

For purchase and repair of machinery and tools for shops at nursery, and for the repair of shops and storehouse, one thousand dollars.

For changing roads in the Executive Mansion grounds (within iron fence) and purchasing broken stone for same, three thousand five hundred dollars.

Executive Mansion. Care, etc.

EXECUTIVE MANSION: For ordinary care, repair, and refurnishing of Executive Mansion, and for purchase, maintenance, and driving of horses and vehicles for official purposes, to be expended by contract or otherwise, as the President may determine, thirty-five thousand dollars.

For fuel for the Executive Mansion greenhouses and stable, six thousand dollars.

For care and maintenance of greenhouses, Executive Mansion, nine thousand dollars.

For repairs to greenhouses, Executive Mansion, three thousand dollars.

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Traveling expenses of the President.

For traveling expenses of the President of the United States, to be expended in his discretion and accounted for on his certificate solely, twenty-five thousand dollars, to be available during the fiscal years nineteen hundred and ten and nineteen hundred and eleven.

Lighting Executive Mansion and public grounds.

LIGHTING THE EXECUTIVE MANSION AND PUBLIC GROUNDS: For gas, pay of lamplighters, gas fitters, and laborers; purchase, erection, and repair of lamps and lamp-posts; purchase of matches, and repairs of all kinds; stoves, fuel, and lights for office and office stable, watchmen's lodges, and for the greenhouses at the nursery, seventeen thousand dollars: *Provided*, That for each five-foot burner not connected with a meter in the lamps on the public grounds not more than eighteen dollars shall be paid per lamp for gas, including lighting, cleaning, and keeping the lamps in repair, under any expenditure provided for in this Act; and said lamps shall burn every night, on the average, from fifteen minutes after sunset to forty-five minutes before sunrise; and authority is hereby given to substitute other illuminating material for the same or less price, and to use so much of the sum hereby appropriated as may be necessary for that purpose: *Provided further*, That four thousand seven hundred dollars of the foregoing sum shall be paid from the revenues of the District of Columbia and the remainder from the Treasury of the United States: *And provided further*, That not more than six thousand dollars of said appropriation may be expended for lighting, extinguishing, cleaning, repairing, and painting park lamps of a higher candlepower than those provided for above and not less than sixty candlepower, which lamps shall cost not to exceed twenty dollars and eighty-five cents per lamp per annum and shall otherwise be subject to the restrictions of this paragraph.

Provisos.
Maximum for lamps.

Part from District revenues.

Higher candlepower.

Electric lighting.

For lighting six arc electric lights in Executive Mansion grounds within the iron fence, at not exceeding eighty-five dollars per light per annum, which sum shall cover the entire cost of lighting and maintaining in good order each of said lights, five hundred and ten dollars.

For lighting six arc electric lights at the propagating gardens, at not exceeding eighty-five dollars per light per annum, which sum shall cover the entire cost of lighting and maintaining in good order each of said lights, five hundred and ten dollars.

For lighting arc electric lights in public grounds, as follows: For seven in grounds south of the Executive Mansion, thirty-two in Lafayette, Franklin, Judiciary, and Lincoln parks, fourteen in grounds south of Executive Mansion and in Monument Park, and sixty-seven in Potomac Park driveway, one hundred and twenty in all, at not exceeding eighty-five dollars per light per annum, which sum shall cover the entire cost of lighting and maintaining in good order each of said lights; in all, ten

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thousand two hundred dollars, one half of which sum shall be paid from the revenues of the District of Columbia and the other half from the Treasury of the United States.

Government telegraph.

TELEGRAPH TO CONNECT THE CAPITOL WITH THE DEPARTMENTS AND GOVERNMENT PRINTING OFFICE: For care and repair of existing lines, five hundred dollars.

Grant memorial.

GRANT MEMORIAL: For continuing work for the erection of the memorial to General Ulysses S. Grant, thirty-five thousand dollars.

Washington Monument. Maintenance.

WASHINGTON MONUMENT: For the care and maintenance of the Washington Monument, namely: For one custodian, at one hundred dollars per month; one steam engineer, at eighty dollars per month; one assistant steam engineer, at seventy dollars per month; one fireman, at fifty-five dollars per month; one assistant fireman, at fifty-five dollars per month; one conductor of elevator car, at seventy-five dollars per month; one attendant on floor, at sixty dollars per month; one attendant on top floor, at sixty dollars per month; three night and day watchmen, at sixty dollars per month each; in all, eight thousand eight hundred and twenty dollars.

Expenses.

For fuel, lights, oil, waste, packing, tools, matches, paints, brushes, brooms, lanterns, rope, nails, screws, lead, electric lights, heating apparatus, oil stoves for elevator car and upper and lower floors; repairs to engines, boilers, dynamos, elevator, and repairs of all kinds connected with the Monument and machinery; and purchase of all necessary articles for keeping the Monument, machinery, elevator, and electric plant in good order, three thousand dollars.

Building where Abraham Lincoln died.

REPAIRS OF BUILDING WHERE ABRAHAM LINCOLN DIED: For painting and miscellaneous repairs, two hundred dollars.

Wakefield, Va.

IMPROVEMENTS, WAKEFIELD, VIRGINIA: For repairs to fences and cleaning up and maintaining grounds about the monument, one hundred dollars.

Statue of von Steuben. Expenses of unveiling.

UNVEILING STATUE OF GENERAL BARON VON STEUBEN: For unveiling and dedicating the statue of General Baron von Steuben and for each and every purpose connected therewith, two thousand five hundred dollars.

Commission of Fine Arts.

COMMISSION OF FINE ARTS: To meet the expenses made necessary by the Act approved May seventeenth, nineteen hundred and ten, entitled "An Act establishing a Commission of Fine Arts," to be disbursed by the officer in charge of public buildings and grounds, on vouchers approved by the commission, who shall be the secretary and shall act as the executive officer of said commission, ten thousand dollars.

Ante, p. 2709.

Rivers and harbors, contract work.

RIVERS AND HARBORS, CONTRACT WORK: Toward the construction of works on harbors and rivers, under contract and otherwise, and within the limits authorized by law, namely:

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Vol. 29, p. 208. For works authorized by the river and harbor Act of eighteen hundred and ninety-six, as follows:

Cleveland, Ohio. Improving harbor at Cleveland, Ohio: For completing improvement under contract authorization, forty-two thousand dollars.

Vol. 30, p. 1121. For works authorized by the river and harbor Act of eighteen hundred and ninety-nine, as follows:

Bay Ridge and Red Hook channels, New York. Improving channel in Gowanus Bay, New York: For continuing improvement of Bay Ridge and Red Hook channels, two hundred and fifty thousand dollars.

Vol. 32, p. 331. For works authorized by the river and harbor Act of nineteen hundred and two, as follows:

Arthur Kill, N. Y. and N. J. Improving Arthur Kill, New York and New Jersey: For continuing improvement of channel from Kill van Kull to Raritan Bay, thirty thousand dollars.

Cleveland, Ohio. Improving harbor at Cleveland, Ohio: For continuing improvement in accordance with plan for new harbor entrance and breakwater extension, in completion of contract authorization, one hundred thousand dollars.

Vol. 33, p. 1117. For works authorized by the river and harbor Act of nineteen hundred and five, as follows:

Saint Marys River, Mich. Hay Lake and Neebish channels. Improving Hay Lake and Neebish channels, Saint Marys River, Michigan: For continuing improvement in completion of contract authorization, forty thousand dollars.

Mississippi River. Saint Paul to Minneapolis. Locks and dams. For continuing improvement of Mississippi River between Saint Paul and Minneapolis by the construction of Locks and Dams Numbered One and Two, in completion of contract authorization, fifty-nine thousand five hundred and forty-three dollars.

Saint Marys River, Mich. Improving Saint Marys River, Michigan: For continuing improvement at the falls, in completion of contract authorization, twenty-five thousand dollars.

Vol. 34, p. 1073. For works authorized by the river and harbor Act of nineteen hundred and seven, as follows:

Black Warrior, etc., rivers, Ala. Improving Black Warrior, Warrior, and Tombigbee rivers, Alabama: For continuing improvement by the construction of locks and dams, in completion of contract authorization, three hundred and twelve thousand dollars.

Boston, Mass. Improving harbor at Boston, Massachusetts: For continuing improvement of thirty-five foot channel, nine hundred thousand dollars.

Bridgeport, Conn. Improving harbor at Bridgeport, Connecticut: For continuing improvement, twenty-five thousand dollars.

Cleveland, Ohio. Improving harbor at Cleveland, Ohio: For continuing improvement in accordance with plan for new harbor entrance and breakwater extension, one hundred and forty-nine thousand dollars.

Detroit River, Mich. Improving Detroit River, Michigan: For continuing improvement of Livingstone Channel in accordance with plan "B," east route, six hundred thousand dollars.

Kennebec River, Me. Improving Kennebec River, Maine: For continuing improvement from the mouth to Gardiner, in completion of

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contract authorization, forty-three thousand five hundred dollars.

Ludington, Mich.

Improving harbor at Ludington, Michigan: For continuing improvement, three hundred thousand dollars.

Mississippi River. From the Ohio to the Missouri.

Improving Mississippi River from mouth of Ohio River to Minneapolis, Minnesota: For continuing improvement of Mississippi River from the mouth of the Ohio River to and including the mouth of the Missouri River, in completion of contract authorization, two hundred and fifty thousand dollars.

From the Missouri to Minneapolis.

For continuing improvement of Mississippi River from the mouth of the Missouri River to Minneapolis, Minnesota, in completion of contract authorization, five hundred thousand dollars.

Ambrose Channel, New York Harbor.

Improving New York Harbor, New York: For continuing improvement of Ambrose Channel, in completion of contract authorization, three hundred and twenty-four thousand five hundred and ten dollars.

Norfolk, Va.

Improving harbor at Norfolk, Virginia: For continuing improvement of harbor and approaches, from deep water in Hampton Roads to the junction of the eastern and southern branches, including removal of shoals at the mouth of the eastern branch, one hundred thousand dollars.

Ohio River. Locks and Dams Nos. 13 and 18.

Improving Ohio River below Pittsburg, Pennsylvania: For continuing construction of Locks and Dams Numbered Thirteen and Eighteen, fifty thousand dollars.

No. 26.

For continuing construction of Lock and Dam Numbered Twenty-six, four hundred thousand dollars.

Passaic River, N. J.

Improving Passaic River, New Jersey: For continuing improvement of channel in Newark Bay and Passaic River, one hundred and fifty thousand dollars.

Saint Marys River, Mich. New canal, etc.

Improving Saint Marys River, Michigan: For continuing improvement at the falls by the construction of a new lock, with a separate canal, six hundred thousand dollars.

San Juan, P. R.

Improving harbor at San Juan, Porto Rico: For continuing improvement, in completion of contract authorization, eighty thousand dollars.

Trinity River, Tex.

Improving Trinity River, Texas: For the construction of locks and dams, in completion of contract authorization, eighty-five thousand dollars.

Mississippi River Commission. Mississippi River. From Head of Passes to the Ohio.

Improving Mississippi River: For continuing improvement of Mississippi River from Head of Passes to the mouth of the Ohio River, including salaries and clerical, office, traveling, and miscellaneous expenses of the Mississippi River Commission, in completion of contract authorization, two million dollars.

Vol. 35, p. 815.

For works authorized by the river and harbor Act of nineteen hundred and nine, and in completion of contract authorizations, as follows:

Appomattox River, Va.

Improving Appomattox River, Virginia: For completion of the work of deflection and improvement of the river at Petersburg, sixty thousand dollars.

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Aransas Pass and Bay, Tex.

Improving Aransas Pass and Bay, Texas: For continuing improvement, three hundred and fifty thousand dollars.

Big Sandy River, W. Va. and Ky.

Improving Big Sandy River, West Virginia and Kentucky: For completing improvement at Dam Numbered One, Tug Fork, and Dam Numbered One, Levisa Fork, Big Sandy River, twenty-five thousand dollars.

Ohio River. Dam No. 37.

Improving Ohio River below Pittsburg, Pennsylvania: For completion of Lock and Dam Numbered Thirty-seven, one hundred and fifty thousand dollars.

Tennessee River, below Chattanooga. Hales bar, Tenn.

Improving Tennessee River below Chattanooga, Tennessee, Alabama, and Kentucky: For continuing improvement at Hales bar, Tennessee, fifty thousand eight hundred and seventy-five dollars.

Maps.

MAPS, WAR DEPARTMENT: For publication of engineer maps for use of the War Department, inclusive of war maps, five thousand dollars.

Survey of Northern and northwestern lakes.

SURVEY OF NORTHERN AND NORTHWESTERN LAKES: For survey of northern and northwestern lakes, including all necessary expenses for preparing, correcting, extending, printing, and issuing charts and bulletins, and of investigating lake levels, with a view to their regulation, to be immediately available, one hundred and twenty-five thousand dollars.

California Débris Commission. Vol. 27, p. 507.

CALIFORNIA DÉBRIS COMMISSION: For defraying the expenses of the commission in carrying on the work authorized by the act of Congress approved March first, eighteen hundred and ninety-three, fifteen thousand dollars.

New York Harbor. Deposits.

HARBOR OF NEW YORK: For prevention of obstructive and injurious deposits within the harbor and adjacent waters of New York City:

Inspectors.

For pay of inspectors, deputy inspectors, office force, and expenses of office, ten thousand two hundred and sixty dollars;

Crews, etc.

For pay of crews and maintenance of six steam tugs and one launch, seventy-five thousand dollars;

Repairs.

For renewing engines and boilers of steam tug Vigilant, fifteen thousand dollars;

In all, one hundred thousand two hundred and sixty dollars.

International Waterways Commission. Vol. 32, p. 373.

INTERNATIONAL WATERWAYS COMMISSION: For continuing the work of investigation and report by the International Waterways Commission, authorized by section four of the river and harbor Act approved June thirteenth, nineteen hundred and two, twenty thousand dollars.

Mississippi River. Bridge, Fort Snelling, Minn.

BRIDGE ACROSS MISSISSIPPI RIVER AT FORT SNELLING, MINNESOTA: For maintenance and repairs, one thousand two hundred dollars.

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UNDER THE DEPARTMENT OF THE INTERIOR.

Interior Department.

* * * * *

MISCELLANEOUS OBJECTS, DEPARTMENT OF THE INTERIOR.

Miscellaneous.

* * * * *

Examination of San Francisco, Cal., water supply.

To enable the Secretary of the Interior to examine into the data required to be submitted by the city of San Francisco with reference to a water supply for that city both from Lake Eleanor and adjacent watersheds partially within the Yosemite Park or from any other available sources of water supply, and to collect such independent data and information as may be necessary in the premises, including all incidental expenses of the officers of the Engineer Corps of the United States Army detailed by the Secretary of War as an advisory board to the Secretary of the Interior in connection therewith, twelve thousand dollars.

* * * * *

Book of Estimates.
Statement of sales, etc., to be separate from.
R. S., sec. 3672, p. 722, repealed.

SEC. 6. Hereafter the statement of the proceeds of all sales of old material, condemned stores, supplies, or other public property of any kind shall be submitted to Congress at the beginning of each regular session thereof as a separate communication and shall not hereafter be included in the annual Book of Estimates.

* * * * *

Executive Mansion, D. C.
Designation of custodian of property in.
R. S. secs. 1832–1834, p. 323, amended.
Bond.

SEC. 9. Hereafter the steward, housekeeper, or such other employee of the Executive Mansion as the President may designate, shall, under the direction of the President, have the charge and custody of and be responsible for the plate, furniture, and public property therein, and shall, before entering upon the duties of the office, give bond for the faithful discharge thereof, said bond to be in the sum of ten thousand dollars, and be approved by the Secretary of War. And hereafter a complete inventory, in proper books, shall be made annually in the month of June, under the direction of the officer in charge of public buildings and grounds, of all the public property in and belonging to the Executive Mansion, showing when purchased, its cost, condition, and final disposition. This inventory shall be submitted to the President for his approval, and shall then be kept for reference in the Office of Public Buildings and Grounds, which shall furnish a copy thereof to the steward, housekeeper, or other employee responsible for the property.

Annual inventory required.

Approval, filing, etc.

Sums for salaries to be in full.

SEC. 10. That all sums appropriated by this Act for salaries of officers and employees of the Government shall be in full for such salaries for the fiscal year nineteen hundred and eleven, and all laws or parts of laws in conflict with the provisions of this Act be, and the same are hereby, repealed.

Approved, June 25, 1910.

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June 25, 1910. [H. R. 26730.] [Public, No. 267.]

CHAP. 385.—An Act Making appropriations to supply deficiencies in appropriations for the fiscal year nineteen hundred and ten, and for other purposes.

Deficiencies appropriations.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums be, and are hereby, appropriated, out of any money in the Treasury not otherwise appropriated, to supply deficiencies in appropriations for the fiscal year nineteen hundred and ten, and for other purposes, namely:

* * * * *

Treasury Department.

TREASURY DEPARTMENT.

* * * * *

Miscellaneous objects.

MISCELLANEOUS OBJECTS, TREASURY DEPARTMENT.

* * * * *

Credit in accounts of Army officers.

Credit in accounts: The accounting officers of the Treasury are authorized and directed to allow credit in accounts of officers of the army in sums disallowed against them on the books of the Treasury, as set forth in House documents of this session, as follows:

* * * * *

In House Document Numbered Nine hundred and forty, Captain A. E. Waldron, Corps of Engineers, one hundred and twenty-two dollars and eighty-five cents;

* * * * *

War Department.

WAR DEPARTMENT.

* * * * *

MISCELLANEOUS OBJECTS.

* * * * *

Battleship "Maine." Removing, etc., wreck in Habana Harbor. *Ante*, p. 2797.

Wreck of battle ship Maine: For additional amount for the raising or the removal of the wreck of the battle ship Maine from the harbor of Habana in accordance with the provisions of the Act approved May tenth, nineteen hundred and ten, two hundred thousand dollars.

William Rydmark. Payment to.

River and harbor improvement: To pay William Rydmark the balance of amount awarded him by the commissioners appointed in nineteen hundred and four in condemnation proceedings relating to lands affected by the building of Lock and Dam Numbered One in the Mississippi River between Saint Paul and Minneapolis, six hundred dollars.

Muskingum River. Repairing levee of dam. Vol. 35, p. 815.

For repairing the break in the levee at Dam Numbered Ten in the Muskingum River, at Zanesville, Ohio, the Secretary of War is authorized and directed to use not exceeding three thousand dollars of the sum appropriated

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in the river and harbor appropriation Act approved March third, nineteen hundred and nine, for the preservation and maintenance of existing river and harbor work.

* * * * *

Approved, June 25, 1910.

CHAP. 389.—An Act To authorize the McKeesport and Mifflin Bridge Company to construct a bridge across the Monongahela River between McKeesport and Mifflin Township, Allegheny County, Pennsylvania.

June 25, 1910. [S. 8766.] [Public, No. 271.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the McKeesport and Mifflin Bridge Company, a corporation organized and existing under the laws of the State of Pennsylvania, is hereby authorized to construct a bridge across the Monongahela River from a point suitable to the interests of navigation on Market street, in the city of McKeesport, Allegheny County, Pennsylvania, to a point on the opposite side of said river in the township of Mifflin, said county and State, in accordance with the provisions of the Act entitled "An Act to regulate construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Monongahela River. McKeesport and Mifflin Bridge Company may bridge, at McKeesport, Pa.

Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, June 25, 1910.

CHAP. 390.—An Act Providing for the erection of a memorial arch at Valley Forge, Pennsylvania.

June 25, 1910. [H. R. 55.] [Public, No. 272.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the expenditure of the sum of one hundred thousand dollars, or so much thereof as may be necessary, be, and the same is hereby, authorized, for the erection upon the site of the encampment during the winter of seventeen hundred and seventy-seven to seventeen hundred and seventy-eight of the American Army at Valley Forge, Pennsylvania, of a memorial arch within the Valley Forge Park, in commemoration of the patriotism displayed and the suffering endured by General George Washington, his officers, and men during said winter: *Provided*, That the money authorized to be expended as aforesaid shall be expended by the Valley Forge Park Commission under the direction of the Secretary of War, and that the location, plans, specifications, and designs for the said arch shall be approved by the Secretary of

Valley Forge, Pa. Expenditure for memorial arch at, authorized.

Provisos. Direction, etc., of Secretary of War.

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Care, etc. War: *Provided further*, That when the said arch is erected the responsibility for the care and keeping of the same shall be with the said Valley Forge Park Commission or as may otherwise be provided by the State of Pennsylvania and without expense to the United States.

Approved, June 25, 1910.

June 25, 1910. [H. R. 12353.] [Public, No. 278.]

CHAP. 396.—An Act Authorizing the Lone Star Canal Company, of Anahuac, Chambers County, Texas, to erect a dam across the mouth of Turtle Bay, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Lone Star Canal Company, of Anahuac, Chambers County, Texas, be, and hereby is, authorized, under the supervision of the Secretary of War, to construct and maintain a bulkhead or dam across the mouth of Turtle Bay, north of Browns Pass of the Trinity River, commencing on the mainland abutting on the property of said company, extending westwardly about one thousand nine hundred feet to a point three hundred feet north of the mouth of said Browns Pass, abutting on state land: *Provided*, That said company shall, at its own expense, provide and keep a lock in said bulkhead or dam at such place and of such dimensions as may be approved by the Secretary of War.

Turtle Bay, Tex.
Lone Star Canal Company may dam.
Proviso. Lock.

Closing passes. SEC. 2. That said company, under the supervision of the Secretary of War, is hereby authorized to close by dam all passes from the Trinity River to said Turtle Bay, also Jacks Pass, connecting Trinity River with Galveston Bay.

Ditch from Trinity River to Smiths Bayou. SEC. 3. That said company, after it shall have acquired title to the right of way, shall have and is hereby granted authority to cut a ditch of such depth and dimensions as may be prescribed by the Secretary of War from the Trinity River, opposite the junction of Old and Trinity rivers, to Smiths Bayou.

Construction. SEC. 4. That the work herein authorized shall not be commenced until the plans therefor shall have been filed in the War Department, and that the said work shall be constructed under the provisions of the Act entitled "An Act to regulate the construction of dams across navigable waters," approved June twenty-first, nineteen hundred and six, and the Act amendatory thereof, approved June, nineteen hundred and ten, so far as the same may be hereto applicable.

Vol. 34, p. 386.
Ante, p. 2823.

Amendment. SEC. 5. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, June 25, 1910.

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CHAP. 407.—An Act To authorize advances to the "reclamation fund," and for the issue and disposal of certificates of indebtedness in reimbursement therefor, and for other purposes. June 25, 1910. [H. R. 18398.] [Public, No. 289.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That to enable the Secretary of the Interior to complete government reclamation projects heretofore begun, the Secretary of the Treasury is authorized, upon request of the Secretary of the Interior, to transfer from time to time to the credit of the reclamation fund created by the Act entitled "An Act appropriating the receipts from the sale and disposal of public lands in certain States and Territories to the construction of irrigation works for the reclamation of arid lands," approved June seventeenth, nineteen hundred and two, such sum or sums, not exceeding in the aggregate twenty million dollars, as the Secretary of the Interior may deem necessary to complete the said reclamation projects, and such extensions thereof as he may deem proper and necessary to the successful and profitable operation and maintenance thereof or to protect water rights pertaining thereto claimed by the United States, provided the same shall be approved by the President of the United States; and such sum or sums as may be required to comply with the foregoing authority are hereby appropriated out of any money in the Treasury not otherwise appropriated: *Provided*, That the sums hereby authorized to be transferred to the reclamation fund shall be so transferred only as such sums shall be actually needed to meet payments for work performed under existing law: *And provided further*, That all sums so transferred shall be reimbursed to the Treasury from the reclamation fund, as hereinafter provided: *And provided further*, That no part of this appropriation shall be expended upon any existing project until it shall have been examined and reported upon by a board of engineer officers of the Army, designated by the President of the United States, and until it shall be approved by the President as feasible and practicable and worthy of such expenditure; nor shall any portion of this appropriation be expended upon any new project.

Reclamation fund.
Transfers from Treasury authorized for projects.
Aggregate.
Appropriation.
Provisos.
Limited to work performed.
Reimbursement.
Examination and approval of projects required.

* * * * *

Approved, June 25, 1910.

CHAP. 425.—An Act Authorizing the Bowling Green and Northern Railroad Company to bridge Green and Barren rivers. June 25, 1910. [H. R. 25560.] [Public, No. 307.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Bowling Green and Northern Railroad Company, a corporation organized under the laws of the State of Kentucky, is hereby authorized to construct, maintain, and operate a bridge and approaches thereto, across the Green River, at a point suitable to the interests

Green River.
Bowling Green and Northern Railroad Company may bridge, at Davis Ferry, Ky.

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of navigation, at or near Davis Ferry, about one mile below said ferry, and about the same distance above Lock Numbered Five, in Edmonson County, Kentucky; also a bridge and approaches thereto across the Barren River, at a point suitable to the interests of navigation, at or about one-half mile or more north of the Louisville and Nashville railroad bridge at Bowling Green, in Warren County, Kentucky, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Barren River, at Bowling Green, Ky.

Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, June 25, 1910.

June 25, 1910. [H. R. 25715.]

[Public, No. 308.]

CHAP. 426.—An Act Authorizing the Kansas City, Mexico and Orient Railway Company of Texas and the Kansas City, Mexico and Orient Railway Company to build two bridges across the Rio Grande.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Kansas City, Mexico and Orient Railway Company of Texas, a corporation organized under the laws of the State of Texas, and the Kansas City, Mexico and Orient Railway Company, a corporation organized under the laws of the State of Kansas are hereby authorized to construct, maintain, and operate a railway bridge, or a railway, wagon and foot bridge, and approches thereto across the Rio Grande from a point suitable to the interests of navigation near Presidio Del Norte, on the Rio Grande, on the Mexican side thereof, to a similar opposite point in the State of Texas in the county of Presidio, called or to be called "El Oro," in the State of Texas, the said bridge to connect the line of railway of the said Kansas City, Mexico and Orient Railway Company of Texas with the line of railway of the said Kansas City, Mexico and Orient Railway in the Republic of Mexico; and also, the above-named railway companies, their successors, and assigns are hereby authorized to construct, maintain, and operate a railway bridge, or a railway, wagon and foot bridge, and approaches thereto across the Rio Grande from a point suitable to the interests of navigation near Del Rio, on the Texas side, to a similar point opposite on the Mexican side, the said bridge to connect a line of railway from the Texas side of said river with a line of railway on the Mexican side thereof; and each of said bridges shall be built in accordance with the provisions of the Act of Congress entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Rio Grande.

Kansas City, Mexico and Orient Railway may bridge.

Presidio Del Norte, Mexico, to El Oro, Tex.

Del Rio, Tex., to Mexican bank.

Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, June 25, 1910.

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CHAP. 427.—An Act To amend an Act to authorize a bridge across the Missouri River at or near Council Bluffs, Iowa, approved February first, nineteen hundred and eight, as amended.

June 25, 1910.
[H. R. 25830.]
[Public, No. 309.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Act to authorize the Central Railroad and Bridge Company to construct a bridge across the Missouri River at or near Council Bluffs, Iowa, approved February first, nineteen hundred and eight, and amended February twenty-seventh, nineteen hundred and nine, is hereby amended so as to give to the Central Bridge Company, of Council Bluffs, Iowa, all the authority and rights granted under said Act if the actual construction of the bridge authorized by said Act is commenced within one year and completed within three years from the date of the passage of this Act.

Missouri River.
Time extended for bridging, at Council Bluffs, Iowa, by Central Bridge Company.
Vol. 35, pp. 3, 660.

Approved, June 25, 1910.

CHAP. 429.—An Act To authorize the building of bridges across the Saint Marys River, Georgia, and the Kootenai River, Idaho.

June 25, 1910.
[H. R. 26349.]
[Public, No. 311.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Saint Marys and Kingsland Railroad Company, a corporation organized under the laws of the State of Georgia, is hereby authorized to construct, maintain, and operate a bridge and approaches thereto across the Saint Marys River at a point suitable to the interests of navigation, at or near a point about one mile west of the town of Saint Marys, in the county of Camden, in the State of Georgia, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Saint Marys River.
Saint Marys and Kingsland Railroad Company may bridge, at Saint Marys, Ga.
Vol. 34, p. 84.

SEC. 2. That the Kootenai Valley Railway Company, a corporation organized under the laws of the State of Washington, is hereby authorized to construct, maintain, and operate a bridge and approaches thereto across the Kootenai River at a point suitable to the interests of navigation at or near Bonners Ferry, in the State of Idaho, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Kootenai River.
Kootenai Valley Railway Company may bridge, at Bonners Ferry, Idaho.
Vol. 34, p. 84.

SEC. 3. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, June 25, 1910.

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June 25, 1910. [H. R. 26458.] [Public, No. 312.]

CHAP. 430.—An Act To authorize the construction and maintenance of a dike on Olalla Slough, Lincoln County, Oregon.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the legal officers of the Olalla diking district, organized under the laws of the State of Oregon, be, and hereby are, authorized to construct upon the foundation already laid, and to maintain a dike across the Olalla Slough, in Lincoln County, Oregon, with a gate therein so constructed and maintained as to be readily opened and easily operated for the purposes of navigation. Said gates may be closed for such time as to prevent the overflowing by the tides of the lands above the dike under regulations to be prescribed from time to time by the Secretary of War: *Provided, however*, That the work now existing shall not be legalized nor shall any new work be commenced until the plans therefor have been filed with and approved by the Secretary of War and Chief of Engineers.

The Olalla Slough, Oreg.

Olalla diking district may construct a dike across.

Closing gates.

Proviso. Approval of plans.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, June 25, 1910.

June 25, 1910. [S. J. Res. 120.] [Pub. Res., No. 43.]

[No. 39.] Joint Resolution Making an appropriation to permit the President to protect lands and property in Imperial Valley, California.

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That the sum of one million dollars, or so much thereof as may be necessary, is hereby appropriated, out of any money in the Treasury not otherwise appropriated, to be expended by the President for the purpose of protecting the lands and property in the Imperial Valley and elsewhere along the Colorado River, within the limits of the United States, against injury or destruction by reason of the changes in the channels of the Colorado River, and the President is authorized to expend any portion of such money within the limits of the Republic of Mexico as he may deem proper in accordance with such agreements for the purpose as he may make with the Republic of Mexico.

Imperial Valley, Cal.

Appropriation to protect from overflow of Colorado River.

Expenditure in Mexico.

Approved, June 25, 1910.

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CHAP. 436.—An Act To confer upon the city of New York the power to obstruct certain navigable waters wholly within its limits.

June 25, 1910.
[S. 6118.]
[Public, No. 318.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress is hereby given to the city of New York, in the State of New York, to obstruct navigation of any river or other waterway which does not form a connecting link between other navigable waters of the United States, and lying wholly within the limits of said city, by closing all or any portion of the same or by building structures in or over the same when the said city shall be lawfully authorized to do so by the State of New York: *Provided, however*, That any such obstruction shall be unlawful unless the location and plans for the proposed work or works before the commencement thereof shall have been filed with and approved by the Secretary of War and Chief of Engineers; and when the plans for any such obstruction have been approved by the Chief of Engineers and by the Secretary of War it shall not be lawful to deviate from such plans either before or after the completion of such obstruction, unless the modification of such plans has previously been submitted to and received the approval of the Chief of Engineers and the Secretary of War: *And provided further*, That the city of New York shall be liable for any damage that may be inflicted upon private property by reason of any of the provisions of this Act.

New York City.
May close certain navigable waters wholly in.
Provisos.
Approval of Secretary of War, etc.
Changes, etc.
Liability for damages.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved, and the United States shall incur no liability for the alteration, amendment, or repeal thereof to the city of New York, or to the owner or owners, or any other persons interested in any obstruction which shall have been constructed under its provisions.

Right to alter, etc.
No liability of United States.

Approved, June 25, 1910.

CHAP. 438.—An Act To give the consent of Congress to the building of a bridge by the cities of Menominee, Michigan, and Marinette, Wisconsin, over the Menominee River.

June 25, 1910.
[S. 7361.]
[Public, No. 320.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress be, and is hereby, given to the cities of Menominee, in the State of Michigan, and Marinette, in the State of Wisconsin, to construct, maintain, and operate a bridge and approaches thereto over the Menominee River between the States of Michigan and Wisconsin, at a point suitable to the interests of navigation, in the vicinity of the existing drawbridge over said river extending from the foot of Main street in the city of Menominee, Michigan, to the foot of

Menominee River.
Menominee, Mich., and Marinette, Wis., may bridge.

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Ogden street in the city of Marinette, Wisconsin, in accordance with the provisions of the Act of Congress entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, June 25, 1910.

June 25, 1910. [S. 7908.]

[Public, No. 322.]

CHAP. 440.—An Act To authorize the Dauphin Island Railway and Harbor Company, its successors or assigns, to construct and maintain a bridge, or bridges, or viaducts, across the water between the mainland, at or near Cedar Point and Dauphin Island, both Little and Big; also to dredge a channel from the deep waters of Mobile Bay into Dauphin Bay, and to dredge the said Dauphin Bay; also to construct and maintain docks and wharves along both Little and Big Dauphin islands.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Dauphin Island Railway and Harbor Company, a corporation existing under the laws of the State of Alabama, be, and it is hereby, authorized to construct, maintain, and operate a railroad bridge or bridges and approaches thereto between the mainland at a point suitable to the interests of navigation at or near Cedar Point and Dauphin Island, both Little and Big, situated in Mobile County, State of Alabama, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Mobile Bay, Ala.

Dauphin Island Railway and Harbor Company may bridge waters of.

Location.

Vol. 34, p. 84.

Wharves and docks in Dauphin Bay, etc.

SEC. 2. That the consent of Congress is hereby given that the said company may build and maintain wharves and docks from Little Dauphin Island, also from Big Dauphin Island, into the waters adjacent thereto, namely, Mobile Bay, Dauphin Bay, Mississippi Sound, and the Gulf of Mexico, at such points and in accordance with such plans as may be recommended by the Chief of Engineers and approved by the Secretary of War.

Channel to Dauphin Bay authorized.

SEC. 3. That the consent of Congress is hereby further given that the said company may build, construct, or dredge a channel from the deep waters of Mobile Bay up to and into Dauphin Bay, cutting or dredging that certain portion of Dauphin Island necessary to construct a straight channel from the proper and most convenient point or points in said deep waters of Mobile Bay to and into Dauphin Bay; and that the consent of Congress is also given that the said company may construct or dredge a basin to the full extent of Dauphin Bay or any part thereof, said bay lying between Little Dauphin and Big Dauphin islands; and that it may use the dredged material in filling, constructing, and reclaiming lands on or adjacent to Little Dauphin and Big Dauphin islands and

Reclaiming lands.

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that it may deposit same at other points which will not interfere with or endanger navigation: *Provided*, That the location, depth, width, and extent of said channel and basin shall be subject to the approval of the Chief of Engineers and the Secretary of War, and until approved by them the work of construction shall not be commenced: *And provided further*, That no portion of said dredged material shall be deposited in any navigable water until the place of deposit has been approved by the Chief of Engineers and the Secretary of War, and the deposit of said material in navigable waters shall at all times be subject to the control of said Chief of Engineers and Secretary of War.

Provisos. Approval by Secretary of War, etc.

Deposit of dredged material.

SEC. 4. That this Act shall not be construed as authorizing the invasion or impairment of the legal rights of any other person or corporation, nor as conferring any right, power, or privilege in conflict with, nor any infringement of, the laws of the State of Alabama; nor as authorizing the use or occupancy of any portion of the Fort Gaines Military Reservation, except in such manner as may be specifically recommended by the Chief of Engineers and approved by the Secretary of War.

Legal rights, etc., not impaired.

Fort Gaines Reservation. Use restricted.

SEC. 5. That the Act approved February fifth, nineteen hundred and six, entitled "An Act to authorize the Mobile Railway and Dock Company to construct and maintain a bridge or viaduct across the water between the end of Cedar Point and Dauphin Island," is hereby repealed.

Bridge, etc., by Mobile Railway and Dock Company repealed. Vol. 34, p. 10, repealed.

SEC. 6. That the consent hereby given shall be considered as withdrawn and deemed to be revoked if actual construction of the work described in sections two and three hereof be not commenced within two years and completed within five years from the date of the approval of this Act.

Time of construction.

SEC. 7. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, June 25, 1910.

June 25, 1910. [S. 8668.]

[Public, No. 323.]

CHAP. 441.—An Act Amendatory of the Act approved April twenty-third, nineteen hundred and six, entitled "An Act to authorize the Fayette Bridge Company to construct a bridge over the Monongahela River, Pennsylvania, from a point in the borough of Brownsville, Fayette County, to a point in the borough of West Brownsville, Washington County."

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the time for commencing and completing the bridge authorized by the Act entitled "An Act to authorize the Fayette Bridge Company to construct a bridge over the Monongahela River, Pennsylvania, from a point in the borough of Brownsville, Fayette County, to a point in the borough of West Brownsville, Washington

Monongahela River. Time extended for bridging, by Fayette Bridge Company, at Brownsville, Pa. Vol. 34, p. 128.

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County," approved April twenty-third, nineteen hundred and six, is hereby extended one and three years, respectively, from the date of the approval of this Act.

Construction. SEC. 2. That the bridge authorized to be constructed by said Act shall be constructed in accordance with the pro-

Vol. 34, p. 84. visions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Amendment. SEC. 3. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, June 25, 1910.

June 25, 1910. [H. R. 550.] [Private, No. 132.]

CHAP. 443.—An Act To pay Edgar F. Luckenbach for damages to his barge C. F. Sargent by collision with the United States dredge Manhattan.

Edgar F. Luckenbach. Payment for damages to barge "C. F. Sargent."

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of the Treasury be, and he is hereby, authorized and directed to pay, out of any money in the Treasury not otherwise appropriated, to Edgar F. Luckenbach, for expenses incurred in repairing damages to his barge C. F. Sargent, caused by the United States dredge Manhattan colliding with said barge in New York Harbor on or about April twenty-fourth, nineteen hundred and eight, the sum of one thousand seventy-seven dollars and seventy-four cents, and said sum of one thousand seventy-seven dollars and seventy-four cents is hereby appropriated out of any money in the Treasury, the said sum to be receipted for and accepted in full settlement and release of all claims on account of said damages.

Approved, June 25, 1910.

June 25, 1910. [H. R. 8667.] [Private, No. 141.]

CHAP. 452.—An Act For the relief of Larnie Dean and James Dean.

Larnie Dean and James Dean. Payment to.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of the Treasury be, and he is hereby, authorized and directed to pay, out of any money in the Treasury of the United States not otherwise appropriated, to Larnie Dean and James Dean, of Marion County, West Virginia, the sum of two hundred dollars, in full compensation for loss of land, overflowed, submerged, and rendered worthless by the construction of locks and dams in the improvement of navigation on the Monongahela River, West Virginia, during the years nineteen hundred and one to nineteen hundred and three, pursuant to an Act of Congress.

Approved, June 25, 1910.

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APPENDIX P P P.

ANNUAL REPORT OF THE MISSISSIPPI RIVER COMMISSION FOR THE FISCAL YEAR ENDING JUNE 30, 1910.

OFFICE MISSISSIPPI RIVER COMMISSION,
St. Louis, Mo., June 30, 1910.

SIR: The Mississippi River Commission has the honor to submit this its annual report for the year ending June 30, 1910.

The act of June 28, 1879, by which the Commission was created, defined its duties as follows:

> To direct and complete such surveys of said river, between the Head of the Passes near its mouth to its headwaters as may now be in progress, and to make such additional surveys, examinations, and investigations, topographical, hydrographical, and hydrometrical, of said river and its tributaries as may be deemed necessary by said Commission to carry out the objects of this act. * * * To take into consideration and mature such plan or plans and estimates as will correct, permanently locate, and deepen the channel, and protect the banks of the Mississippi River; improve and give safety and ease to the navigation thereof; prevent destructive floods; promote and facilitate commerce, trade, and the postal service; * * *

Under the authority of this act and subsequent laws relating to the subject, surveys and observations have been carried on and works of improvement under the authority and direction of laws making appropriations for that purpose have been undertaken and executed. The original project, contained in the report of the Mississippi River Commission dated February 17, 1880, contemplated the permanent fixing and improvement of the channel to a depth of at least 10 feet at extreme low water by the contraction of the low-water width to about 3,000 feet, the protection of the banks against caving, and the control of the flood waters by means of levees. This report was the one upon which Congress made its first appropriation for the river improvement under Commission plans, thereby officially adopting such plans for the inauguration of work. The works designed primarily for the rectification and improvement of the channel have been confined to the Plum Point Reach, 147 to 186 miles, and Lake Providence Reach, 517 to 552 miles below Cairo. These reaches were selected because here the shifting sand bars and deficient depths were the most pronounced and the low-water navigation was the most difficult. Highly beneficial results were obtained in the improvement of the channel depths in those reaches, and the work done in them confirmed the soundness of the theory upon which it was based, but also demonstrated that the permanent improvement of the channel by contraction and revetment works would necessarily consume a long period of time, while the pressing needs of commerce called for immediate relief. Fortunately the development in hydraulic dredging machinery had reached such a stage as to hold out the hope that an immediate and economical solution of the problem of temporarily deepening the channel for navigation purposes might be found in the

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opening and maintenance of channels across the obstructing bars at each low-water season by means of dredging. After studies and experiments extending over several years this method of temporary improvement of the low-water channel was adopted, with a view to maintaining a navigable channel 250 feet in width and not less than 9 feet in depth, and has been applied with success. The history of the work from the beginning, and of the experiences which led to the adoption of this method and the reasons therefor, are fully detailed in former reports.

One of the important items in the operations of the Commission is the general repair and construction of levees, which was first authorized without qualifying restrictions by the act of September 19, 1890, and since that date about one-half of the appropriations made by Congress have been devoted to that purpose.

The project under which the work of the Commission has been conducted for several years past and which is proposed for the year to come may be stated in general terms as follows:

1. Continuation of surveys; preparation and publication of maps, maintenance of gauges; the recording, tabulation, and publication of gauge readings; the taking and recording of discharge measurements at high and low stages of the Mississippi River and its tributaries, and other observations.
2. The building, extension, and repair of levees.
3. The building, maintenance, and operation of dredge boats.
4. The repair and extension of existing works for the improvement of the channel, the preservation of harbors, the prevention of cut-offs, and the security of levees.
5. The maintenance of a low-water channel between the Mississippi, Red, and Atchafalaya rivers.

Other miscellaneous details incident to the execution of the general project, all of which are treated in the following pages.

APPROPRIATIONS AND ALLOTMENTS.

The river and harbor act approved March 2, 1907, authorized the letting of contracts to the extent of $6,000,000, in addition to the amount appropriated by the act, this sum to be used in prosecuting the improvement for not less than three years beginning July 1, 1908.

By the sundry civil act approved May 27, 1908, $2,000,000 of the above $6,000,000 was appropriated.

By the sundry civil act approved March 4, 1909, $2,000,000 more of the above $6,000,000 was appropriated, and $1,867,000 of the amount thus appropriated was allotted on recommendation of the Mississippi River Commission, as shown on page 2643 of the Report of the Chief of Engineers for 1909. The remaining $133,000 was allotted during the year on recommendation of the Commission, as follows:

Upper St. Francis levee district	$25,000
Extension of Old Town Bend revetment	50,000
Revetment in Kempe Bend	40,000
Reelfoot levee district	10,000
Survey of Tennessee chute	500
Mississippi River Commission	7,500
	133,000

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By the sundry civil act approved June 25, 1910, $2,000,000, the remainder of the $6,000,000 authorized by the river and harbor act, approved March 2, 1907, was appropriated for continuing improvement of the Mississippi River from Head of the Passes to the mouth of the Ohio River including salaries and clerical, office, traveling, and miscellaneous expenses of the Mississippi River Commission. The amount thus appropriated has been allotted on recommendation of the Mississippi River Commission, as follows:

GENERAL.

Mississippi River Commission	$35,000	
Surveys, gauges, and observations	65,000	
Dredges and dredging	380,000	
		$480,000

FIRST AND SECOND DISTRICTS.

Surveys	5,000	
Upper St. Francis levee district	35,000	
Lower St. Francis levee district	85,000	
White River levee district	50,000	
Reelfoot levee district	15,000	
Walnut Bend	55,000	
Old Town Bend	30,000	
Plant	50,000	
Hopefield Bend	50,000	
Repairs to existing works and stone	40,000	
		415,000

THIRD DISTRICT.

Surveys	5,000	
Lower Yazoo levee district	160,000	
Upper Tensas levee district	120,000	
Panther Forest	20,000	
Vaucluse	20,000	
Fitlers	20,000	
Reid-Bedford	40,000	
Repairs to existing works, and stone	75,000	
Plant	80,000	
Greenville, Miss	40,000	
		580,000

FOURTH DISTRICT.

Surveys	5,000	
Lower Tensas levee district	160,000	
Atchafalaya levee district	32,000	
Barataria levee district	25,000	
Pontchartrain levee district	27,000	
Lake Borgne levee district	17,000	
Kempe Bend	90,000	
Natchez and Vidalia, Miss. and La	44,000	
Red and Atchafalaya rivers	25,000	
Plant	100,000	
		525,000
Total		2,000,000

By the river and harbor act approved June 25, 1910, the sum of $2,000,000 was appropriated for continuing improvement of the Mississippi River from Head of Passes to the mouth of the Ohio River, including salaries, clerical, office, traveling, and miscellaneous expenses of the Mississippi River Commission. One million nine hundred and seventy-seven thousand dollars of the amount thus ap-

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propriated was allotted on recommendation of the Mississippi River Commission, as follows:

GENERAL.

Mississippi River Commission	$5,000	
Surveys, gauges, and observations	45,000	
Dredges and dredging	35,000	
		$85,000

FIRST AND SECOND DISTRICTS.

Repairs to existing works	70,000	
Hopefield Bend	25,000	
Walnut Bend	75,000	
Old Town Bend	40,000	
Upper St. Francis levee district	75,000	
Reelfoot levee district	10,000	
Lower St. Francis levee district	100,000	
White River levee district	60,000	
Wolf River	10,000	
Upper Yazoo levee district	40,000	
Plant, repairs, renewals, and maintenance	50,000	
New plant	185,000	
		740,000

THIRD DISTRICT.

Panther Forest	20,000	
Vaucluse	20,000	
Fitlers Bend	20,000	
Reid-Bedford	40,000	
Albemarle Bend	400,000	
Plant	100,000	
		600,000

FOURTH DISTRICT.

Giles Bend, Natchez and Vidalia harbors	130,000	
Hard Times Bend	5,000	
New Orleans Harbor	175,000	
Lower Tensas levee district	50,000	
Pontchartrain levee district	23,000	
Lake Borgne levee district	6,000	
Atchafalaya levee district	25,000	
Lafourche levee district	13,000	
Homochitto levee district	3,000	
Plant	122,000	
		552,000
		1,977,000
Unallotted balance		23,000
		2,000,000

In addition to the above appropriations, $9,100 was allotted by the Chief of Engineers for the fiscal year ending June 30, 1910, from the permanent indefinite appropriation made by act of August 11, 1888, as amended by act of June 13, 1902, for gauging the waters of the Mississippi River and its tributaries, which is applied to the maintenance of certain river gauges.

The following reallotments of funds have been made during the year:

From allotment for closure of chute of Island 26 to bank revetment, Hopefield Bend	$13,914.41
From White River levee district to plant, first and second districts	10,000.00
From White River levee district to Hopefield Bend, for purchase of stone	10,000.00

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Details of the expenditures of the various allotments are appended hereto.

MISSISSIPPI RIVER COMMISSION.

One change has occurred during the year in the membership of the Commission. Mr. Henry B. Richardson died August 21, 1909, and was succeeded by Mr. Charles H. West, appointed January 28, 1910, and qualified February 5, 1910.

There has been no change in the personnel of officers in charge of works under the Commission.

Three sessions of the Commission were held during the year, the one hundred and tenth and the one hundred and eleventh, on board the steamer *Mississippi* during the low-water inspection of the river. October 25 to 30, 1909, and during the high-water inspection, April 12 to 21, 1910, respectively; the one hundred and twelfth at the offices of the Commission in St. Louis, Mo., June 23–25, 1910.

At all of these sessions, except on the low-water trip, when the Commission accompanied the party of the President of the United States, public hearings were given to representatives of the navigation, commercial, and other interests of the river.

SURVEYS, GAUGES, AND OBSERVATIONS.

Surveys.—The field work of the general survey of the Mississippi River from Head of the Passes to the headwaters was completed in July, 1904, and the reduction and platting of the field notes of the last two field seasons have been partly completed. The extent and character of the general survey is given in the annual report of the Commission for 1905.

The field work of the low-water survey from Cairo to the mouth of the Arkansas River was completed in November, 1904, and the reduction and platting of the field notes were completed in the office in 1906. The cross sections of this survey and those of the surveys of 1877–1884 have since been platted, and the areas, depths, and widths measured for low, medium, and high stages. A comparison of these elements to determine the changes that have occurred in the regimen of this part of the river is in hand and the results will be submitted in the next annual report.

Owing to the discrepancy of about 1 foot found to exist in the earlier line of precise levels from the Gulf to Fort Adams, Miss., in 1900, as stated in previous annual reports, the rerunning of the precise levels northward has been continued from time to time until February 26, 1909, when the work reached Memphis.

This releveling now extends from the jetties to Memphis, Tenn., a distance by river of about 840 miles, not including the side line of 87 miles from Biloxi to New Orleans. The reduction of all field notes has been completed in the office and the results tabulated. No field work was done during the present year, but it is proposed to relevel between Memphis and Cairo during the coming season.

Many of the permanent marks of the general survey of the river having been destroyed in the years that have elapsed since they were set, a party was put in the field in the fall of 1905 to restore the system. This work has been prosecuted during succeeding low-water seasons since, and was completed to Donaldsonville in January,

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1910. The field work of the last season extended from Greens Landing to Donaldsonville, a distance by river of 170 miles. The field notes of this last season are now being reduced in the office.

As the stone line bench marks below Donaldsonville have mainly been established since 1893 it is not proposed to extend this work over that stretch of the river at present.

Maps.—No maps or charts have been published during the year.

Charts Nos. 252 to 261 drawn to scale of 1 to 5,000, extending this series from above Leech Lake River to upper end of Lake Winnibigoshish, Minnesota, about 1,297 miles above Cairo, are completed ready for publication.

Charts Nos. 262 to 267 of this series are being drawn.

The reduction of the field notes of the general survey of the river near its headwaters is nearly completed.

Gauges.—The regular gauges, high-water gauges, and tide gauges have been maintained during the year, periodic inspections being made for the purpose of making needed repairs to gauges and bulletins and testing the gauges.

During the low-water season of 1909 the Mississippi River reached only a moderately low stage and no low-water slope observations were made except at the regular gauge stations, which are about 50 miles apart. At Little Rock on the Arkansas River the stage fell to 0.4 foot below the previous lowest, that of 1879; and at Monroe, on the Ouachita River, the stage fell to 0.3 foot lower than that of 1908, which was the lowest previously recorded. The stages of the other tributaries were not remarkable during the year.

Table No. 1, accompanying the secretary's report, gives the dates and lowest readings at all gauge stations.

During the present high-water season the rivers have attained only very moderate stages and no readings have been taken on the high-water gauges below Cairo. The highest reading on the Cairo gauge so far this year was 42.15 feet on March 15.

Table No. 6, accompanying the secretary's report, gives the highest gauge readings on the Mississippi River and its tributaries during the present high-water season to June 30, 1910.

Discharge observations.—The high-water discharge of the Mississippi River was measured at St. Louis, Mo., and at Thebes, Ill., in July, 1909. No other discharge observations were made during the present fiscal year as at no other places have rivers reached the stages prescribed by the Commission for these observations. The results of all discharge observations have been reduced and tabulated.

For further details concerning the foregoing attention is invited to the report of First Lieut. C. H. Knight, Corps of Engineers, U. S. Army, secretary, appended hereto.

DREDGES AND DREDGING.

Project.—A statement of the project under which the hydraulic dredges of the Commission have been built, maintained, and operated will be found on page 8 of the Annual Report for 1904. Nine dredges are now available for operation under this project. The preparation of plans for another dredge has been authorized, but work on these plans has been suspended until the experimental

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changes now being made in the dredge *Gamma*, with a view to increasing the output of the dredges, have been tested.

Plans for a new inspection boat for use in connection with dredging operations have been drawn and specifications prepared.

The use of anchors and 3,000-foot steel wire cables, for hauling ahead in dredging, was tested on the dredge *B. M. Harrod* during the season with satisfactory results. The dredge *Beta* is being similarly equipped with 3,000-foot cables.

The success attained in dredging and the importance of unfailing maintenance of the channel is discussed in the reports of 1905 and subsequent years, and the recommendations made therein for ample funds to carry on this work continuously as required is again renewed.

Season's operations.—The lowest stage during the dredging season of 1909 was 6.94 feet on the Cairo gauge, October 15. This was only a moderately low stage, and the project dimensions of channel were maintained without difficulty during the regular navigation season. Owing, however, to the severely cold weather in December and ice gorges above Cairo, the river fell again, and for a few days early in January, 1910, shoal crossings developed at Point Pleasant and Pecan Point, and depths of 7½ and 8 feet, respectively, were found at these two crossings during a period when navigation was suspended. The dredges that were kept in the field for such an emergency were sent to these places, but dredging was rendered impossible by running ice; as the river began to rise rapidly about January 6, giving ample depths at all crossings thereafter, the dredges were tied up and as soon as the ice permitted were withdrawn from the field.

Six dredges, the *Beta*, *Delta*, *Iota*, *Kappa*, *Henry Flad*, and *B. M. Harrod*, were in commission during the season, and dredging was done by them at eleven bars from Medleys, 31 miles below Cairo, to Montezuma, 312 miles below Cairo.

The season's dredging operations began early in August, 1909, and the last dredge was withdrawn from the field and laid up at West Memphis, Ark., January 14, 1910.

For further details concerning the dredges and dredging, attention is invited to the report of First Lieut. C. H. Knight, Corps of Engineers, U. S. Army, secretary, appended hereto.

CHANNEL WORK, BANK PROTECTION, AND HARBOR IMPROVEMENTS IN THE SEVERAL DISTRICTS.

First district, from Cape Girardeau, Mo., to the foot of Island 40 (270 miles).—Headquarters: Custom-house, Memphis, Tenn. District officer, Maj. M. L. Walker, Corps of Engineers.

Construction works for channel improvement, protection of caving banks, and harbor work in this district are located at Columbus and Hickman, Ky., New Madrid and Caruthersville, Mo., and Plum Point reach, together with certain isolated works, consisting of low-water channel dikes at different points throughout this district.

Columbus, Ky., 21 miles below Cairo, left bank.—The work at this point was done in 1889 and 1890, and consists of five submerged dikes, protecting about 2,200 feet of harbor front. No repairs have been made since.

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Hickman, Ky., 36 miles below Cairo, left bank.—The work at this point consists of 1,450 feet of effective continuous revetment placed in 1889, 1892, and 1894 to prevent caving along the lower portion of the town. Slight repairs were made in 1900 on account of injury to the revetment from local drainage. The work is now in good condition, and nothing additional is at present contemplated.

New Madrid, Mo., 71 miles below Cairo, right bank.—This work consists of bank revetment extending along the river front of the town, of continuous fascine mattresses 260 feet wide below low water, with riprap paving on the graded bank above low water. Nine hundred feet of revetment were constructed in 1893, and afterwards extended as follows: Seven hundred feet in 1894, 500 in 1896, 1,373 in 1898, and 1,000 in 1900. The present effective revetment is 4,450 feet long, and is in good condition.

Caruthersville, Mo., 110 miles below Cairo, right bank.—The work at this point consists of one spur dike and a continuous revetment for the protection of the caving bank in front of the town. There is now about 2,400 feet of effective revetment at this point.

Plum Point reach, 147 to 186 miles below Cairo.—The works in this reach comprise about 68,200 feet of revetment for the protection of caving banks, the partial closure of the chutes behind Elmot bar and Island 30 with a brush and stone dam, the closure of Osceola and Bullerton chutes with pile dikes, and a levee along the left bank to confine the flood waters more nearly to the low-water channel. The object of all these works was to increase the navigable depth at low water in a reach of river which had been noted for years for its obstructing sand bars. As a result the banks have remained practically fixed within prescribed limits, and the navigable depth at low water has been increased to such an extent that little or no difficulty has been experienced in navigating this reach since the works approached completion. At no time since the works were well under way has navigable depth reached as low a point as it did nearly every low-water season prior to the construction of the rectification works.

Considerable repairs to the revetment were made during the past working season along Luxora front and an upstream extension of 810 feet on Osceola front.

For further details concerning work in the first district see report of Major Walker, appended hereto.

Second district, foot of Island 40 to White River (173 miles).—Headquarters: Custom-house, Memphis, Tenn. District officer, Maj. M. L. Walker, Corps of Engineers.

This district includes the protection of caving banks and harbor work at Hopefield Bend, Ark., Memphis, Tenn., and at Porter Lake, Helena, Walnut Bend, and Old Town, Ark., and also dredging of Wolf River, Tenn.

Hopefield Bend, Ark., 227 miles below Cairo, right bank.—This revetment, originally 16,600 feet long, was constructed at various times between 1882 and 1889, and has been repaired at various times. By 1906 this revetment had been replaced by 14,800 feet of standard revetment, and the paving had been carried to the top of the bank over practically all of this length. The fault disclosed after the high water of 1909 has been partially repaired, and some additional patch work was done throughout the reach. Another large pocket caved in

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toward the lower end of the work April 10, 1910. It is feared that this work is generally in a more or less critical condition, since due to recent changes, it is subjected to violent current action, causing heavy scour in the channel along the edge of the mattress.

Wolf River, 230 miles below Cairo, left bank.—The part of this stream under improvement is a part of Memphis Harbor, and the improvement consists of dredging for the purpose of maintaining a 5-foot navigable channel during the low-water season from its mouth 2½ miles upstream to the county bridge. During the past year no work was done in this river. The bar at the mouth is largely composed of soft mud and sawdust. The lumber interests on Wolf River render maintenance of a navigable channel a worthy public undertaking. Under present conditions navigation is suspended during low-water periods.

Memphis Harbor, 230 to 232 miles below Cairo, left bank.—The work along the Memphis front embraces the protection of 14,800 linear feet of bank by means of spur dikes and continuous revetment, the upper portion of which is covered by a sand bar which encroaches somewhat upon the levee front of the city. The area of this bar between Wolf River and the levee front is about 100 acres at low water, of which 12 acres is above water at the 25-foot stage. The cross sections over the lower end of the bar show no marked change in its location or size. The revetment along the Memphis front is in good condition. No repairs were made during the past season.

Walnut Bend, Ark., 281 miles below Cairo, right bank.—This bend has been caving rapidly for the past few years and the Mississippi River threatened to cut through into the St. Francis River, which would materially raise the low-water level of the St. Francis River, inundating much land that is normally under cultivation when the Mississippi River is within its banks. Also such action would prevent the extension of the Lower St. Francis levee across Hardins Point, which extension has now been made to a point opposite river mile 290, and lowers the backwater effect over a very considerable territory behind the levee.

The efficiency of abattis dikes as bar builders suggested their use at this point to build a bar down into the caving bend and thus protect the bank. (For details of abattis dike construction, see Report Chief of Engineers, 1899, pp. 3518–19, and Pl. 15.) Two dikes were built in the season of 1906 and it was contemplated to build two more in the season of 1907. The 1906 dikes built a considerable bar, but the situation became so critical in 1907 that revetment work was commenced and has been continued each year. No further dikes have been constructed owing to lack of plant, and during the past season both the existing dikes were breached. During the season 1907–8, 1,800 linear feet of bank protection was placed. The next season effort was made to draw the main river away from the bend by a dredge cut across the bar opposite. This was unsuccessful and an extension of 2,000 linear feet was made to the revetment.

During the past season it was contemplated to extend the revetment about 800 feet upstream. Before work was commenced, however, a bad fault developed in the work placed during 1907–8, and all available funds were expended in repairing this, since the levee was imminently threatened. This work was carried out under great difficulties, due to very strong current and to several runs of heavy ice. About

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February 15, 1910, another large fault developed in the 1907–8 work, which will have to be repaired during the coming season, or the levee will be breached.

Helena, Ark., 306 miles below Cairo, right bank.—The revetment work at this place consists of the protection of 4,900 linear feet of river bank in front of the city, of which 3,500 feet is continuous revetment and 1,400 feet is dike work. There is no change in the bank line along this front, and the revetment seems to be intact. During October, 1908, an extensive "slip" occurred in front of the city, taking about 500 feet of the levee, but, as far as could be ascertained, did no damage to the revetment. A small mat was placed in the unrevetted space between dikes Nos. 3 and 4 during 1908–9. A small fault developed during 1909–10, but it is unimportant, and this work is considered in good condition.

Old Town, Ark., 324 miles below Cairo, right bank.—The bank in this bend has been caving slowly for a long time, and had finally cut in so close to the levee that either the bank must be protected or a loop must be built in the levee along the caving bend. A survey was made, to show the cost of such a loop, and owing to a lake immediately in the rear of the present levee the cost of this loop was estimated at $370,000. The bank could be held by standard revetment for less than half of this amount, and since this bank protection would not only obviate the necessity for the costly loop, but would serve as an improvement to the channel, it was decided to protect the bank. For similar reasons to those set forth in regard to Walnut Bend, it was decided to construct two abattis dikes in the upper part of the bend in the season of 1906, with the hope that they would build a bar down into the bend and protect it from further caving. The conditions at this point were very unfavorable for the use of the abattis dikes, but it was considered justifiable to try them, since the estimate for the abattis dikes was only $18,000 and the estimate for revetting this bend with the standard revetment was about $170,000, and even in case the abattis dikes did not give the desired results they would still protect the upper end of any revetment that would be put in later. Two abattis dikes were constructed in the upper part of the bend 1,370 feet apart. The upper dike was 900 feet long and the lower one 1,260 feet long, and the total cost was $13,383.19. A survey in March of 1907 showed that although a bar had been built around these dikes, the effect in the bend below was not sufficient to warrant building further dikes in the season of 1907, and the project for the revetment of this bend was submitted and approved. During the season of 1907–8 3,615 feet of revetment was built at this point, and the bank was paved to a suitable height. During the season of 1908–9 the revetment was extended about 1,200 feet downstream, and a further downstream extension of 2,400 feet was made during the past season.

For further details concerning the work in the second district see report of Major Walker, appended hereto.

Third district, from White River to Warrenton, Miss. (214 miles).—Headquarters: Vicksburg, Miss. District officer, Capt. Clarke S. Smith, Corps of Engineers.

This district includes the works of improvement on the Mississippi River at Panther Forest, Leland Neck, and Vaucluse, Ark.; Lake Bolivar front, Ashbrook Neck, Greenville Harbor, Longwood, and

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Fitlers Bend, Miss.; Louisiana Bend, Lake Providence revetment and reach, Delta Point, and Reid-Bedford Bend, La.; at Red Fork, Ark., on the Arkansas River; and levee work in the Lower Yazoo and the Upper Tensas levee districts. Operations of the past year included the construction of a new revetment at Leland Neck, Ark., repairs or extensions or both to revetments at Panther Forest, Ark.; Lake Bolivar front, Ashbrook Neck, Greenville Harbor, Fitlers Bend, Miss.; Lake Providence and Reid-Bedford Bend, La.; Red Fork, Ark., and levee work in both levee districts.

Lake Bolivar front, 417 miles below Cairo, left bank.—The work at this point consists of revetment, begun in 1888–89, to hold the caving bank and prevent the destruction of a levee across the head of Lake Bolivar, which would have necessitated the building of a long and very expensive loop back of the lake. Repairs have been made at different times to the upper bank paving. In 1905–6, 2,134 feet of reenforcing mattress was placed; in 1906–7 repairs of two sections of bank paving were made and a pocket mat placed; in 1907–8 about 1,250 feet of fascine mattress was placed, reenforcing the upper end from about 125 feet below the head of the 1905–6 work to a point at station 3+50; several connecting mats of various sizes added; grading and paving the banks between stations 3 and 21, and minor repairs to the original work completed; in 1908–9 minor repairs were made in resloping and repaving the upper bank, and during the past season a channel mat 515 feet long at the upstream end of the work and three shore mats aggregating 1,500 squares at places where defects appeared were added. The effective revetment is 3,800 feet long; the subaqeous mattress for 300 feet is of the old woven type, and for about 3,400 feet is of the old type reenforced by the fascine type.

The revetment appears to be in good condition except the upper bank paving at the extreme downstream end.

Ashbrook Neck, 446 miles below Cairo, left bank.—The work here consists of 10,100 feet of revetment built to prevent a cut-off which would have disturbed the regimen of the river for a long distance above and below and brought disaster to towns, levees, and other works along the river bank. Repairs have been made to the upper bank paving from time to time and the original mattress has been reenforced where showing signs of weakness. In 1906–7 one large and one small pocket were repaired and the old woven mattress reenforced for a length of 1,200 feet by a fascine mattress. There still remains 1,000 feet of the old work not reenforced. Of the balance 8,600 feet is reenforced with standard fascine mattress, and 500 feet is fascine mattress extension. During the past season minor repairs were made by constructing two small pocket mats and repairing some slight defects in the upper slope.

The entire work appears to be in good condition.

Panther Forest, Ark., 452 miles below Cairo, right bank.—This revetment is designed to protect an angle in the main levee, at a point where a new loop would have been very expensive. The work done in 1908–9 consisted of the construction of 2,037 linear feet of standard revetment. A sudden settlement of the bank occurred below the revetment just before the close of the past season, making it necessary to place a mat there, which was completed with a length of

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301 feet. Slight caving is in progress at the upstream end of the revetment and more rapid caving at the downstream end.

Leland Neck, Ark., 470 miles below Cairo, right bank.—This is a new revetment designed to prevent a cut-off across the narrow neck at this place, which occurrence would have a disastrous effect similar to that referred to in connection with the original necessity for work at Ashbrook Neck. Three channel mats aggregating 3,150 linear feet, together with 12 connecting mats and the usual upper bank paving were completed during the past season. The work is believed to be in excellent condition.

Greenville Harbor, 478 miles below Cairo, left bank.—The town and harbor of Greenville and the levee along its front are protected by a bank revetment having an effective length of 13,100 feet, of which 1,200 feet is of old type-woven mattress, 11,100 feet is of such type reenforced with fascine mattress, and 800 feet is old dike protection repaired with fascine pocket mats. During the twelve years, from 1882 to 1894, the bank at the Greenville Bend receded a distance of 4,000 feet. This work was begun in 1887 when 10 submerged dikes were placed. The plan was changed to continuous revetment in 1891, and since the completion of the work it has been effective in maintaining the bank line. Repairs have been made from time to time. About 600 feet of bank was protected in 1906–7, and in 1907–8 a channel mat about 400 feet long with connecting mats to the upper bank paving was placed; three connecting mats were constructed between dikes, and exposed points which had been subjected to scour were riprapped. In 1908–9 the repairs consisted in constructing a shore mat 117 by 260 feet in a pocket which had formed in the bank due to eddy action, and a channel mat 133 by 540 feet where a break had occurred, and in regrading and repaving in connection with these repairs. During the past season a channel mat 741 feet long was constructed to reenforce some old work and a minor break in the bank paving at the upstream end was repaired.

This revetment has done excellent work.

Vaucluse, Ark., 487 miles below Cairo, right bank.—This revetment is designed to protect the main levee where it crosses the bed of an old lake and where a new loop would have been very expensive. The work done in 1908–9 consisted in the construction of 1,864 linear feet of standard revetment. No repairs or extensions were made during the past season. A heavy deposit has covered the upstream half of the revetment, but caving continues beyond the ends.

Longwood, Miss., 500 miles below Cairo, left bank.—Bank revetment was placed in the rapidly caving bend here in 1904–5, to prevent the destruction of a large levee, comparative study having shown that a loop around the threatened section would have been far more expensive. The effective length of the revetment is 4,200 feet, all of the standard fascine type. Although an extension of this revetment 1,000 feet downstream was provided for in 1905, it has not been found necessary, and from changed conditions in the bend it is probable that further work here can be postponed indefinitely.

Lake Providence reach, 517–552 miles below Cairo, right bank.—This section of the river was selected by the Commission soon after its formation, for improvement of the low-water channel by means of contraction works and revetment of caving banks. Though marked

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deepening of shallow crossings resulted, the work was finally discontinued because of lack of funds, and the enactment of a law limiting the use of bank revetment. Most of the structures, which were comparatively weak, have been destroyed, but a much improved low-water channel still obtains. In later years active revetment work was resumed at Louisiana Bend and at Lake Providence, but with special objects in view.

Louisiana Bend, 522 miles below Cairo, right bank.—The revetment in this bend is part of the systematic improvement of Lake Providence reach. Work was begun in 1889, and was continued from time to time as funds were available until 1897. No extension or repair of this work has been made since then. The original work was 15,820 feet long, of which about 4,000 feet at the lower end has been destroyed and more than half of the remaining 11,820 feet is covered by a bar at the upper end.

Lake Providence, La., 540 miles below Cairo, right bank.—The bank revetment here protects the town of Lake Providence and the important levee across the foot of the lake. It has an effective length of 12,600 feet, of which 1,200 feet is unreenforced old-type woven mattress, 1,700 feet is such type renforced with fascine mattress, 5,000 feet is fascine mattress reenforced with fascine mattress, and 4,700 feet is original fascine mattress. During the season 1906–7 a mattress 600 feet long was sunk to cover defects caused by high water of the previous season, and a reenforcing mattress was begun, which had to be sunk before it was completed on account of a rapid rise in the river. In 1907–8 the uncompleted repairs of the previous season were finished, a mattress about 860 feet long was placed, and repairs made to the upper bank grading and paving. In 1908–9 three minor breaks in the upper slope paving were repaired, and during the past season very slight repairs were made to the upper bank paving. From present indications the work appears to be in good condition.

Fitlers Bend, Miss., 550 miles below Cairo, left bank.—An allotment made in August, 1906, provided for revetment in this bend to protect the levee from destruction by caving of the bank; otherwise a new levee would soon have been required at such great cost as to be almost impracticable of accomplishment. No work was done in 1906–7 because of lack of plant and outfit. The work in 1907–8 consisted of placing of two channel mats and seven connecting mats, protecting about 2,000 feet of bank, the greater portion of which was graded and paved. Foot mats were also constructed along the entire work to make a proper connection between the upper bank and the subaqueous work. In 1908–9 a shore mat 90 by 135 feet was placed at the upper end of the revetment, where a pocket had formed, and the upper bank was regraded and paved at this place. During the past season an upstream extension of about 1,000 linear feet was added by the construction of a channel mat and four connecting mats, with the corresponding upper bank paving making a total length of revetment of about 3,000 linear feet. At present the revetment appears to be in good repair except the downstream end, where some of the upper bank paving has caved in.

Delta Point, La., 598 miles below Cairo, right bank.—The object of this work is to hold the point opposite Vicksburg and prevent

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further recession of the channel downstream away from the harbor, and thus aid in the improvement of Vicksburg Harbor. It has an effective length of 5,900 feet, of which 4,600 feet is woven mattress, 600 feet of such type reenforced with fascine mattress, and 700 feet is original fascine mattress. No work has been done since 1899.

Reid-Bedford Bend, La., 603 miles below Cairo, right bank.—An allotment made in August, 1906, provided for revetment in this bend to protect a long line of important levee from destruction by caving of the bank. This bend of the river is very unfavorable for either revetment or levee work. It has a sloughing bank where large sections settle slowly and slide out; the adjacent land is low and swampy, and the current attains a high velocity in the deep water close to the bank. Each of the numerous sections of abandoned levees has its borrow pit, from which the impounded water seeps through the bank, assisting in its destruction.

Mattresses were placed in 1906–7 covering about 2,000 feet of bank, but owing to the high stage of water no upper bank paving was possible. The work contemplated for 1907–8 was of such magnitude that the short working season and lack of sufficient plant made its undertaking impracticable. In 1908–9 two standard channel mats, aggregating 1,400 feet in length, were added to the revetment, together with ten connecting mats containing 2,510 squares. The upper bank was graded and paved throughout the entire length of the old and new work and a brushwork protection was placed at each end. During the past season the revetment was extended upstream 961 linear feet by the construction of a channel mat and four connecting mats, with the usual bank paving. Repairs were made at a break above the old revetment by constructing a small shore mat and regrading and repaving above it. The work appears to be in good condition.

Red Fork, Arkansas River.—Under project of July, 1907, a loop was constructed at Red Fork to replace a section of the controlling levee threatened by the caving of the bank, and under project of December, 1907, bank protection at this point was authorized for the protection of the levee in order to avoid the construction of a long, expensive loop around Lake Belcoe.

The revetment built the previous season to protect the angle of the levee was practically uninjured by the severe freshets in Arkansas River in November and December, 1908. Caving below the lower end of the revetment made it necessary to add an extension, which now makes the length of the revetment 1,100 feet. During the past season only very minor repairs were made, and the revetment appears to be in good condition.

Further details of the work in this district may be found in the report of Captain Smith, hereto appended.

Fourth district, Warrenton, Miss., to Head of Passes, 607–1,060 miles below Cairo.—Headquarters: 3338 St. Charles avenue, New Orleans, La. District officer, Maj. H. Burgess, Corps of Engineers.

The works include bank protection in Bondurant Chute, bank protection in Kempe Bend, improvement of harbors at Natchez and Vidalia, rectification of Red and Atchafalaya rivers, and improvement of the harbor at New Orleans, La.

Bondurant Chute, 644 miles below Cairo, right bank.—This work was undertaken in 1899 in order to prevent the destruction of the levee lying between the upper end of Lake Bruen and the bank of the

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river, no other location of the levee line being practicable in the immediate vicinity and its abandonment involving the construction of a loop several miles long around and behind the lake. In addition to the cost of constructing this new line of levee to replace the old one, the abandonment of the latter would result in the exposure to overflow of a large amount of cultivated land.

The revetment consists of mattresses constructed of lumber and willow brush and a few experimental ones built entirely of lumber, for the submerged portion, with upper bank paving of concrete. The revetment has a total length of 3,550 linear feet and is in good condition.

The work of the past year was confined to extending the revetment 110 feet farther downstream to cover a pocket which had formed at the lower end of the work, and to repairs to the upper bank pavement. As a whole the revetment is considered a complete work, requiring only current repairs and maintenance, and has resulted in the prevention of any further recession of the bank line at the revetment, and consequent destruction of the levee.

Kempe Bend, 658 miles below Cairo, right bank.—The object of this work has been to prevent further erosion of the bank line in Kempe Bend, which has already destroyed several lines of levee and nearly reached a final line, the destruction of which would necessitate a long line of new levee of extremely difficult and costly construction. The construction of a new line would also require a long period of time, and a break in the front line in the meantime would be disastrous to a large section of the country below Kempe. Work on this revetment was begun in 1899 and continued each season since that time until, at the date of the last annual report of the Commission, it had reached a length of 11,146 linear feet.

During the past season revetment work at the lower end of the bend, 9,560 feet below the upper work, was commenced, 2,105 linear feet of standard revetment being placed. This work was rendered necessary by rapid caving of the unprotected bank at the lower end of the bend, threatening the destruction of the levee line at that point. In addition to this, extensive repairs were made to the upper 11,146 feet of revetment placed in previous years. The subaqueous revetment in Kempe Bend has now a total length of 13,251 feet in two detached pieces; upper, 11,146 feet long, and lower, 2,105 feet long. The unprotected gap between has a length of about 9,560 feet.

The work has been successful thus far in protecting the levee, though numerous small failures of portions of the revetment have occurred, permitting the upper bank line to recede slightly. The present condition of the work is good.

Harbors at Natchez and Vidalia, Miss. and La., 688 miles below Cairo.—The object of this work is to prevent a threatened cut-off, which would destroy the harbors of Natchez and Vidalia and disturb the general regimen of the river for many miles above and below, and to prevent the destruction of the river front of the city of Natchez by caving of the bank.

The general project for this work, adopted in 1891, contemplated the construction of a levee on or near the axis of Cowpen Neck, to prevent a flow of water across the neck during high stages of the river, and the construction of about 16,000 linear feet of revetment in Giles Bend.

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Work on the levee was begun in 1894 and completed in 1895, the levee being 19,500 feet long. The levee was raised and enlarged in 1898.

Work on the revetment was begun in 1897 and continued each season since that time until, at the date of the last annual report of the Commission it had reached a length of 21,848 linear feet, in two detached pieces of 8,592 and 13,256 feet, respectively.

During the past season operations were confined to repairs and maintenance of the existing revetment and the spur levee on Cowpen Neck. The lower subaqueous revetment was renewed for a length of 2,025 linear feet, and 1,449 linear feet of upper bank was regraded and paved. The levee on Cowpen Neck was cleared of weeds and briers, and washed places repaired and sodded. No extension of the revetment was made, and the total length of the subaqueous work remains 21,848 linear feet in two detached pieces of 8,592 and 13,256 feet, respectively. The unprotected interval between the pieces is about 1,400 feet.

The work in place has been successful, but the gap between the two detached pieces of revetment in Giles Bend must be closed. The levee along the axis of Cowpen Neck is in good condition.

Work on the Natchez front was begun in 1907, and there was constructed during the fiscal year 1907–8 two detached pieces of revetment, 1,150 and 1,400 feet long, respectively, with an unprotected interval of 2,000 feet length. The upper bank was graded for 1,794 linear feet and paved for 900 linear feet. No work was done during the past fiscal year, the revetment being in good condition.

Junction of the Mississippi, Red, and Atchafalaya rivers, Louisiana, 764 miles below Cairo.—The improvement in this locality consists in the maintenance of mattress sill dams in the Atchafalaya River for the purpose of preventing the enlargement of that stream and dredging the low-water channel of Old River for the purpose of maintaining an adequate depth between the Mississippi, Red, and Atchafalaya rivers.

The original sills were placed in 1887–8, and since that time no enlargement of the Atchafalaya has been observed. The dams are apparently in good condition, and beyond slight repairs to maintain them no further work is contemplated in this section.

During the past season dredging was required in Lower Old River in order to maintain a suitable channel for navigation. Dredging on the bar at the Mississippi entrance to Old River was commenced on August 17 and ceased on October 9, when a channel of ample width with a least depth of 12 feet had been obtained. Dredging of the mud lumps or ridges in the channel about one-half mile west of the Texas and Pacific Railway bridge was commenced on August 21 and continued at intervals until November 19, when the rising river rendered further work unnecessary. Operations were successful and navigation was not interrupted or impeded at any time, although the river declined until the Red River Landing gauge read 5.4 and the Barbres 3.8. During the year the current in Old River has remained practically constant from the Mississippi toward the Atchafalaya.

New Orleans Harbor, 965 miles below Cairo, right and left bank.—The object of the work in this harbor is to prevent the erosion of banks and consequent loss and damage to adjacent property. The work consists mainly of spur dikes placed at intervals of about 450

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feet and of continuous revetment of the lower bank. In places where erosion was specially active continuous revetment was placed between the spurs.

Work under the present project was begun in 1883 and has continued each season, as funds were available, until at the date of the last annual report of the Commission the banks were protected as follows: In Carrollton Bend for 7,360 feet by continuous mattress and for 1,970 feet by five spur dikes in conjunction with continuous mattress; in Greenville Bend, opposite Audubon Park, for 1,940 feet by two spur dikes, and for 1,570 feet at Amesville by continuous mattress; in the Gouldsboro-Algiers Bend, for 9,475 feet by twenty-four spur dikes; and in the third district reach for 9,400 feet by fourteen spur dikes in conjunction with continuous mattress. A total of about 6 miles of bank is thus protected by dikes and continuous revetment.

During the past season operations were confined to the Carrollton Bend, 1,155,000 square feet of mattress, covering 3,955 linear feet of bank, was placed at the lower end of the existing revetment at this locality, which has now a total length of 13,330 feet. The aggregate length of bank protected in New Orleans Harbor, in whole or in part, is now 35,715 feet. All of this work, so far as is known, is in good condition.

The steep banks and great depths of water make the preservation of the banks in New Orleans Harbor both difficult and expensive, and the danger of sudden collapse in certain localities is by no means remote. Under the conditions here found it is of more than ordinary importance that ample means should be provided for the extension and completion of the revetment necessary to make the river banks along the city front reasonably safe.

For further details concerning the work in this district, see the report of Major Burgess, Corps of Engineers, appended hereto.

PLANT.

First and second districts.—The plant belonging to these districts is laid up and cared for, when not in use in the field, below the Memphis bridge on the Tennessee shore. One motor boat was added during the year. Repairs necessary to keep the plant in good condition were made during the year. The plant generally is in fair condition.

For further details as to plant in first and second districts, reference is made to report of Major Walker, hereto appended.

Third district.—During the past year eight new material barges and one line barge of creosoted lumber were constructed for this district at the Rock Island district boat yards, and a new quarter boat is in process of construction there. Four new steel barges, now under construction, will soon be completed, and a steel floating dry dock is in process of manufacture, due to be delivered at Vicksburg in November of this year.

General repairs to plant were made during the year.

For further details regarding the plant of the third district see report of Captain Smith, hereto appended.

Fourth district.—The plant pertaining to the fourth district is cared for at New Orleans, La. General repairs to the entire plant

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have been made, and it is now, with the exception of such portions as are worn out, in good condition. During the year five standard creosoted barges and two creosoted hull quarter boats were built by hired labor, and a steel-hull towboat was constructed under contract.

For further details of the plant in the fourth district, reference is made to the report of Major Burgess, hereto appended.

Plant in charge of the secretary.—The steamer *Mississippi*, used for the inspection trips of the Commission, the steamers and quarter boat used in the general surveys, and the dredges, with the steamers, towboats, pile sinkers, and barges used in connection with the dredging operations are cared for at West Memphis, Ark., where a general supply and repair depot has been established. Necessary repairs have been made during the year and the plant maintained in good condition.

The construction of the dry dock at the dredge depot at West Memphis, Ark., has been under way during the year, and is about 90 per cent complete. This dock is of the side-haul railway type, of 1,500 tons capacity, or sufficient to haul out the heaviest boat in charge of the Commission.

For details of this plant, reference is made to the report of First Lieutenant Knight, appended hereto.

STONE.

For the purpose of furnishing stone for revetment works in the third district, a stone quarry, near Searcy, Ark., purchased by the United States, in 1899, is operated when towing stages exist in Little Red and White rivers.

Operations this year were begun at the quarry January 24, 1910, and it is expected to obtain between 10,000 and 15,000 cubic yards of stone during the present season. On account of the short towing season, due to low water in Little Red River, the amount is less than last year.

Details of the year's operations are given in the report of Captain Smith, hereto appended.

Stone for use in the other districts has been purchased.

Details on this subject are given in the reports of the district officers hereto appended.

SURVEYS IN THE ENGINEER DISTRICTS.

In order to keep in close touch with the condition of the improvement works, the caving banks, and changes affecting the regimen of the river, annual surveys are made, covering mainly portions of the river under improvement. The discussion of the results will be found in the reports of the district officers herewith.

In addition to the above a special survey was made in the second district to determine the area of the willow and gravel bars, with a view to ascertaining the amount of revetment material available for future work. Similar surveys were made in the other districts last year.

Special surveys were also made in the fourth district at Marengo Bend, Plaquemine Bend, and New Orleans Harbor.

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LEVEES.

For convenience in administration and the allotment of funds for levee purposes the river front has been divided by the Commission into levee districts. The names and locations of these districts as authorized by the Commission will be found on pages 2620–2621 of the report of the Chief of Engineers for 1907.

The following table, which is similar to that given in last year's report, has been brought up to date and shows the present condition of the levees and the levee operations during the past year, as compiled from the reports of the district officers:

Levee district.	In system.	Built.	Contents 1909.	Built since by United States.	Built since by local authorities.	Total built since 1909.
	Miles.	*Miles.*	*Cu. yds.*	*Cu. yds.*	*Cu. yds.*	*Cu. yds.*
Upper St. Francis	90.00	57.25	2,726,104	166,231	130,000	296,231
Lower St. Francis	212.00	207.50	24,500,696	301,267	695,180	996,447
White River	74.00	74.00	10,938,570	63,711	28,000	91,711
Reelfoot	21.00	21.00	1,578,546	4,876	None.	4,876
Upper Yazoo	124.00	124.00	29,982,611	None.	777,059	777,059
Lower Yazoo	188.40	188.40	41,972,163	299,386	1,449,390	1,748,776
Upper Tensas	192.90	189.40	37,377,765	605,574	814,399	1,419,973
Lower Tensas	160.59	153.64	22,801,733	1,264,603	211,500	1,476,103
Atchafalaya	127.19	127.19	22,064,286	None.	238,713	238,713
Lafourche	82.02	82.02	9,656,072	None.	20,597	20,597
Barataria	71.88	71.88	3,569,497	75,482	154,667	230,149
Pontchartrain	125.77	125.77	18,423,891	116,302	447,099	563,401
Lake Borgne	78.25	78.25	4,137,420	72,792	96,823	169,615
Total	1,548.00	1,500.30	229,729,354	2,970,224	5,063,427	8,033,651

Levee district.	Lost or abandoned during the year.	Contents 1910.	Required to complete.	Estimated final contents.	Per cent now built.	Approximate area protected.
	Cu. yds.	*Cu. yds.*	*Cu. yds.*	*Cu. yds.*		*Sq. miles.*
Upper St. Francis	None.	3,022,335	.....	.....	.....	700
Lower St. Francis	185,000	25,312,143	.....	.....	.....	3,500
White River	None.	11,030,281	5,839,962	16,870,243	65.4	910
Reelfoot	None.	1,583,422	.....	.....	.....	310
Upper Yazoo	315,912	30,443,758	.....	.....	.....	3,281
Lower Yazoo	None.	42,720,939	11,896,300	55,617,239	78.6	3,367
Upper Tensas	1,220,000	37,577,738	10,725,000	48,302,738	77.8	2,500
Lower Tensas	311,100	[a] 23,966,736	6,310,601	30,277,337	79.1	2,080
Atchafalaya	129,100	22,173,899	3,462,500	25,636,399	86.5	6,085
Lafourche	18,700	9,657,969	1,734,397	11,392,366	84.8	2,020
Barataria	100,081	3,699,565	674,096	4,373,661	84.6	
Pontchartrain	333,084	[b] 18,654,208	3,060,726	21,714,934	85.9	1,816
Lake Borgne	55,124	4,251,911	1,098,122	5,350,033	79.5	
Total	2,668,101	235,094,904	.....	.....	.....	26,569

[a] This amount includes 191,539 cubic yards placed on the new Hard Times levee previous to May 1, 1909, but not included in last year's report on account of levee not being completed and old levee being the controlling line, and 52,819 cubic yards placed on the new Greens levee not included in this amount on account of levee not being completed and old levee being controlling line.

[b] This amount includes 78,173 cubic yards placed on the new Revenue levee previous to May 1, 1909, but not included in last year's report on account of levee not being completed and old levee being the controlling line; 53,551 cubic yards placed on the new Gem levee not included in this amount on account of levee not being completed and old levee being the controlling line.

The "estimated final contents" of the levees given above is based on grades and sections, as heretofore provisionally recommended by the Commission.

The estimated final contents of the Upper and Lower St. Francis and the Reelfoot levees is not given in the above table, as the extension

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of levees in these districts has materially modified the high-water slopes and a new provisional grade line has been adopted, as follows:

Table of gauge readings of flood heights and levee grades.

Name of gauge station.	Highest known water.		Provisional levee grade adopted June, 1910.	
	Gauge reading.	Year.	Referred to gauge.	Referred to Memphis datum.
	Feet.		*Feet.*	*Feet.*
Commerce				343.9
Cairo	52.17	1883	55.2	332.9
Belmont	45.58	1883	51.3	325.0
New Madrid	40.27	1897	45.6	308.2
Cottonwood Point	39.96	1903	44.3	281.8
Fulton	40.15	1903	44.6	260.0
Memphis	40.30	1907	45.6	236.5
Mhoons	42.20	1907	46.8	214.9

NOTE.—Memphis datum approximately 6.7 feet below mean Gulf level at Biloxi.

The loss of levee by abandonment on account of caving river banks or for other causes during the past year, as shown in the above table, was 2,668,101 cubic yards, which amounts to 1½ per cent of the contents of the existing levees. Nearly one-half of this is in the Upper Tensas levee district.

High water.—In the absence of what is usually considered high water this year, the levees have sustained no damage on this account and no high-water protection has been necessary.

The highest gauge readings of this year at selected stations, comprising mainly those at the mouths of the larger tributaries, are given in the following table. It will be noticed that the slopes of the last two years differ materially from those of the highest known water which has occurred in various years from 1883 to 1907.

Station.	Highest gauge reading, 1910.		Highest known gauge reading.		1910 lower than highest known.	Highest gauge reading, 1909.	1910 lower than 1909.
	Date.	Height.	Year.	Height.			
		Feet.		*Feet.*	*Feet.*	*Feet.*	*Feet.*
Cairo	March 15	42.15	1883	52.17	10.02	47.27	5.12
Memphis	March 19	33.20	1907	40.30	7.10	38.60	5.40
Helena	March 21	40.70	1897	51.75	11.05	47.65	6.95
Mouth White River	March 23	44.45	1903	53.70	9.25	49.95	5.50
Vicksburg	March 25-26	40.60	1897	52.48	11.88	48.00	7.40
Red River Landing	March 28	38.50	1897	50.20	11.70	46.04	7.54
Carrollton	March 29-30	12.95	1903	19.42	6.47	16.55	3.60
Fort Jackson	March 31-April 3	6.20	1907	8.30	2.10	7.60	1.40

Additional details regarding this subject will be found in the reports of the district officers appended hereto.

REVETMENTS FOR THE PROTECTION OF LEVEES AND THEIR IMPORTANCE IN THE DEVELOPMENT OF NAVIGABLE CHANNELS.

This subject was fully discussed by the Commission in its Annual Report for 1908 on pages 2654 to 2656. In accordance with the views expressed therein, work of this kind has been continued and

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has been done during the year, as already described, at Walnut Bend (281), Old Town Bend (324), Panther Forest (452), Fitlers Bend (550), Reid-Bedford (603), and Kempe Bend (658). The results of these works have been very satisfactory at the various localities and seem to fully justify their construction. The total length of existing revetment is given in the following table:

Mississippi River, mouth of the Ohio River to Head of the Passes, effective length of bank protection, June, 1910.

Locality.	Miles below Cairo.	Bank of river.	Bank protected.
			Linear feet.
Columbus, Ky	21	Left	1,920
Hickman, Ky	36	Left	970
New Madrid, Mo	71	Right	4,450
Caruthersville, Mo	110	Right	2,342
Plum Point Reach:			
Daniels Point, Ark	152	Right	5,000
Ashport, Tenn	155–159	Left	21,300
Fletchers Bend, Ark	158–161	Right	17,250
Osceola, Ark	163–165	Right	2,550
Bullerton Bar, Ark	168	Right	14,500
Hopefield Bend, Ark	227–230	Right	14,800
Memphis, Tenn	230–232	Left	16,000
Walnut Bend, Ark	280	Right	4,050
Helena, Ark	306	Right	4,900
Old Town Bend, Ark	325	Right	7,255
Red Fork, Ark	402	Right	1,100
Lake Bolivar front	417	Left	3,800
Ashbrook Neck	446	Left	10,100
Panther Forest	452	Right	2,037
Leland Neck, Ark	471	Right	3,150
Greenville, Miss	478	Left	13,100
Vaucluse, Ark	487	Right	1,864
Longwood, Miss	500	Left	4,200
Lake Providence Reach:			
Louisiana Bend	522	Right	11,320
Lake Providence, La	540	Right	12,600
Fitlers Bend, Miss	550	Left	3,000
Delta Point, La	598	Right	5,900
Reid-Bedford Bend, La	603	Right	3,500
Bondurant	644	Right	3,500
Kempe	656–661	Right	13,251
Giles Bend	686–691	Left	21,348
Natchez front	700	Left	2,550
New Orleans Harbor	960–970		
Carrollton		Left	13,330
Greenville		Right	3,510
Gouldsboro-Algiers		Right	9,475
Third District		Left	9,400
			270,322=51.2 miles.

NOTE.—In addition to the above there is about 1,500 linear feet of effective bank protection at Plaquemine, La., 854 miles below Cairo. This work was done in connection with the lock at that place.

REVETMENTS FOR THE PROTECTION OF CITY FRONTS AND HARBORS.

The position of the Commission in regard to allotments for work for this purpose was fully stated in its Annual Report for 1908. During the year allotments have been made where the necessity was most urgent.

FRAGMENTARY AREAS ON EAST BANK.

The attention of Congress has been called in former reports, beginning as far back as 1894, to the situation of the narrow and irregular strip of land lying between the Mississippi River and the highlands east of it between Vicksburg and Baton Rouge—a distance of 234 miles by the river. Within these boundaries the alluvial

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lands are cut across by a number of small streams coming in from the hills, so as to form, in connection with the devious course of the river, detached areas difficult of protection by levees. The elevation of the general flood levels, which has resulted from the extension of the levee system in recent years, subjects those lands to deeper overflow than they were subject to formerly or would be subject to now if the levee system were not in existence. The people living in the larger of these overflowed areas have been clamoring for aid in the building of levees to protect their lands for sixteen years past. But the Commission has been unable to see its way to the recommendation of allotments for that purpose out of the appropriations, for the four reasons that the construction of levees along these fronts did not appear to have as important value here as elsewhere in improvement of the channel; and the expense of them was out of proportion to the value of the lands to be protected; and the inhabitants were unable to bear the share of the expense which the Commission required as a condition of government aid elsewhere; and the funds appropriated from year to year were all necessary for other works of larger importance. Some of the landowners in these areas have brought suits for damages in the Court of Claims, which, though pending for many years, have as yet been unavailing. While it is not within the province of the Commission to express any opinion as to the legal merits of these suits, it is apparent to anyone that there must be great difficulty in the way of adequate relief in that manner. The immediate cause of the injuries complained of is the increased elevations of the flood heights. That is the result of the general confinement of the flood discharge by the levee system as a whole. That system has been constructed in part by the United States, but in larger part by the various levee organizations along the river created by the laws of the States bordering it. The case is manifestly one for legislative rather than judicial treatment. Relief in some form ought in justice to come from Congress and the state legislature in cooperation. But such cooperation would be so difficult to attain that it is hardly worth the thought. Meanwhile the litigation drags its slow length along, the lives of the landowners are passing away, and hope deferred is making their hearts sick. The situation is pathetic and distressing in the highest degree. That these people should be condemned to perpetual inundation without possibility of relief or redress, for the sake of an improvement from which their fellow-citizens are enjoying great benefits, is intolerable to any man's sense of justice.

It appears to the Commission that there are three possible ways of dealing with the problem. One is to assist the owners of the inundated lands by helping them to build levees where that method of protection is economically possible. Another is to compensate them in damages for the injuries which they have sustained. A third would be to buy the lands and devote them to forestry. There is more to be said in favor of the last of these suggestions than might appear at first blush. The lands are capable of growing many kinds of valuable timber. They could be made to produce much material for revetment and other works of improvement in the river. If the fields were abandoned to natural growth the land would be gradually built up by deposit and they might become highly valuable for cultivation.

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Upon the whole, the Commission recommends that a special commission be appointed to investigate the subject with such directions as Congress shall deem suitable to the case.

RECOMMENDED APPROPRIATION.

In previous reports the Commission has set forth at length the necessity for an increase in the work of bank revetment for the triple purpose of protecting strategic points in the existing costly lines of levees, preventing injurious changes in the river, and improving navigation by deepening the channel and diminishing the activity of bar building. Numerous revetments, each undertaken in the face of urgent necessity, have been begun and carried to the point of completion required to meet the immediate emergencies, but which must have further extensions for complete and permanent results. At other places the caving banks are advancing toward levee lines which can not be abandoned without irreparable loss and which can be saved most certainly and economically by the interposition of bank protection. These conditions now exist in so many places on the river that the present outfit of plant is inadequate for the work. It is intended to recommend extensive additions to revetment plant out of the appropriations for the coming year. The completion of these will greatly increase the effectiveness and economy of the work provided subsequent appropriations are made in amounts sufficient to keep the enlarged plant occupied. There is no continuing appropriation for works on the lower Mississippi River to look forward to after the expiration of the next fiscal year. An interruption of the work at that time would entail losses beyond estimate. In view of all these circumstances, the recommendation which follows, of an appropriation of $4,000,000 for expenditure on the lower Mississippi River during the fiscal year ending June 30, 1912, is in the nature of a statement of a necessity.

ESTIMATE OF ADDITIONAL FUNDS REQUIRED.

Amount that can be profitably expended in fiscal year ending June 30, 1912, exclusive of the balance unexpended July 1, 1910:

For continuing the improvement of Mississippi River from Head of Passes to the mouth of the Ohio River, including salaries and clerical, office, traveling, and miscellaneous expenses of the Mississippi River Commission, $4,000,000.

Respectfully submitted.

WM. H. BIXBY,
Brig. Gen., Corps of Engineers, U. S. Army,
President Mississippi River Commission.
ROBT. S. TAYLOR,
J. A. OCKERSON.
HOMER P. RITTER,
Assistant, U. S. Coast and Geodetic Survey.
WM. T. ROSSELL,
Colonel, Corps of Engineers, U. S. Army.
J. G. WARREN,
Lieut. Col., Corps of Engineers, U. S. Army.
C. H. WEST.

The CHIEF OF ENGINEERS, U. S. ARMY.

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Money statements.

APPROPRIATIONS EXPENDED UNDER MISSISSIPPI RIVER COMMISSION.

Appropriation for improving Mississippi River.

July 1, 1909, balance unexpended		*$2,951,438.11
Amount appropriated by sundry civil act approved June 25, 1910	$2,000,000.00	
Amount appropriated by river and harbor act approved June 25, 1910	2,000,000.00	
Miscellaneous receipts from reimbursements, sales of engineer property under the provisions of section 5 of river and harbor act of June 18, 1902, and other sales	2,001.57	
		4,002,001.57
		6,953,439.68
June 30, 1910, amount expended during fiscal year		2,292,092.39
July 1, 1910, balance unexpended		4,661,347.29
July 1, 1910, outstanding liabilities	64,214.03	
July 1, 1910, amount covered by uncompleted contracts	460,544.79	
		524,758.82
July 1, 1910, balance available		4,136,588.47
Distributed as follows:		
Mississippi River Commission		34,220.96
Surveys, gauges, and observations		70,045.94
Levees		69,546.60
Revetment and contraction works, permanent channel improvements and protection		10,079.62
Dredges and dredging		416,363.51
Plant and miscellaneous		2,455.16
Improving harbors and tributaries		12,876.68
Allotments available July 1, 1910, and unallotted		3,521,000.00
		4,136,588.47

Amount necessary to be appropriated for the fiscal year ending June 30, 1912, in addition to the balance unexpended July 1, 1910.

For continuing the improvement of the Mississippi River from Head of the Passes to the mouth of the Ohio River, including salaries and clerical, office, traveling, and miscellaneous expenses of the Mississippi River Commission	$4,000,000.00

* The amount, $2,951,432.25, reported in Annual Report for 1909, has been increased $5.86 during the fiscal year, as follows:

Refundment of overpayments—	
By secretary, January, 1910, allotment for "Dredges and dredging"	$2.67
By first and second districts officer—	
July, 1909, allotment for "Plum Point reach"	.25
September, 1909, allotment for "Plant"	.18
To correct error in financial statement of first and second districts officer for August, 1908, allotment for "Lower St. Francis levee district"	2.76
	5.86

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Appropriation for gauging waters of the Mississippi River and its tributaries.[a]

July 1, 1909, balance unexpended		[b] $1,883.92
Amount allotted by Chief of Engineers, July 13, 1909, from permanent annual appropriation made by section 6 of river and harbor act of August 11, 1888, as amended by section 9 of river and harbor act of June 13, 1902		9,100.00
		10,983.92
June 30, 1910, amount expended during fiscal year	$8,735.60	
June 30, 1910, amount reverted to Treasury during fiscal year	268.37	
		8,998.97
July 1, 1910, balance unexpended		1,984.95
July 1, 1910, outstanding liabilities		1,476.89
July 1, 1910, balance available		508.06
Amount that can be profitably expended in fiscal year ending June 30, 1912, in addition to the balance unexpended July 1, 1910		9,100.00

Itemized statement of expenditures during the fiscal year ending June 30, 1910, submitted in compliance with requirement of section 6 of river and harbor act of August 11, 1888.

Observations:		
Pay of permanent gauge observers		$3,600.00
Inspections and repairs:		
Inspection of gauges on Mississippi River by junior engineers and parties on steamers	$1,647.75	
Inspection of gauges on tributaries	275.89	
Renewals and repairs of gauges and bulletins	749.52	
		2,673.16
Office expenses and contingencies:		
Pay of assistant and junior engineers, recorders, and clerks	2,042.91	
Stationery, printing, office rent, etc	419.53	
		2,462.44
		8,735.60

CONSOLIDATED STATEMENT OF ALL APPROPRIATIONS EXPENDED UNDER THE MISSISSIPPI RIVER COMMISSION TO JUNE 30, 1910.

Appropriation for improving Mississippi River.

Act of June 28, 1879 (organic)	$175,000.00
Act of June 16, 1880 (sundry civil)	150,000.00
Act of March 3, 1881 (river and harbor)	1,000,000.00
Act of March 3, 1881 (sundry civil)	150,000.00
Act of August 2, 1882 (river and harbor)	4,123,000.00
Act of August 7, 1882 (sundry civil)	150,000.00
Act of March 3, 1883 (sundry civil)	150,000.00
Act of January 19, 1884	1,000,000.00
Act of July 5, 1884 (river and harbor)	75,000.00
Act of July 5, 1884 (river and harbor), less $5,000 transferred to snag-boat service	2,065,000.00
Act of July 7, 1884 (sundry civil)	75,000.00
Act of August 5, 1886 (river and harbor), less $5.942.60 for expenses, office Chief of Engineers	1,994,057.40

[a] The custody and care of the gauges maintained under this appropriation were assumed by the Mississippi River Commission February 11, 1901, on which date they were transferred to the secretary under authority of Secretary of War, dated January 25, 1901.

[b] The amount, $1,880.67, reported in Annual Report for 1909, has been increased $3.25, paid by Treasury Settlement No. 9268, September 14, 1909, from unexpended balance of allotment for 1908, previously reported as reverted to Treasury.

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Act of August 5, 1886 (river and harbor), less $47.30 for expenses, office Chief of Engineers		$29,952.70
Act of August 11, 1888 (river and harbor), less $4,859 for expenses, office Chief of Engineers		2,840,141.00
Act of August 11, 1888 (river and harbor)		75,000.00
Act of October 2, 1888 (sundry civil)		35,000.00
Act of October 19, 1888 (deficiency), less $4,214.39 reverted to the Treasury		20,785.61
Act of September 19, 1890 (river and harbor)		3,200,000.00
Act of September 30, 1890 (deficiency)		5,625.00
Act of March 3, 1891 (deficiency)		1,950.00
Act of March 3, 1891 (joint resolution)		1,000,000.00
Act of July 13, 1892 (river and harbor)		2,470,000.00
Act of July 28, 1892 (deficiency)		44.80
Act of March 3, 1893 (sundry civil)		2,665,000.00
Act of August 18, 1894 (river and harbor)		485,000.00
Act of August 18, 1894 (sundry civil)		2,665,000.00
Act of March 2, 1895 (sundry civil)		2,665,000.00
Act of June 3, 1896 (river and harbor)		909,000.00
Joint resolution approved March 31, 1897 (Public, No. 6)		250,000.00
Act of June 4, 1897 (sundry civil)		2,933,333.00
Act of July 19, 1897 (deficiency)		625,000.00
Act of July 1, 1898 (sundry civil)		1,983,333.00
Act of March 3, 1899 (sundry civil)		2,583,333.00
Act of March 3, 1899 (river and harbor)		185,000.00
Act of June 6, 1900 (sundry civil), less $5,000 for expenses, office Chief of Engineers		2,245,000.00
Act of June 13, 1902 (river and harbor)		2,200,000.00
Act of March 3, 1903 (sundry civil)		2,000,000.00
Act of April 28, 1904 (sundry civil)		2,000,000.00
Act of March 3, 1905 (river and harbor)		1,000,000.00
Act of March 3, 1905 (sundry civil)		2,000,000.00
Act of June 30, 1906 (sundry civil)		2,000,000.00
Act of March 2, 1907 (river and harbor)		3,000,000.00
Act of May 27, 1908 (sundry civil)		2,000,000.00
Act of March 4, 1909 (sundry civil)		2,000,000.00
Act of June 25, 1910 (sundry civil)		2,000,000.00
Act of June 25, 1910 (river and harbor)		2,000,000.00
Total specific appropriations		63,179,555.51
Balances from former appropriations applied to works below Cairo under act of August 2, 1882, less $123.42 reverted to Treasury	$272,504.96	
Same for works above Cairo, under act of July 5, 1884	22,632.53	
Total balances		295,137.49
Miscellaneous receipts:		
Previously reported	37,554.02	
Amount received by transfer from appropriation for examinations, surveys, and contingencies of rivers and harbors (survey of Ohio River) for tentage transferred to U. S. engineer office, Louisville, Ky., credited to "Surveys, gauges, and observations," secretary's office, November, 1909	81.60	
Amount received by transfer from appropriation for maintenance of river and harbor works (Arkansas River at Pine Bluff, Ark.) for towing barge, credited to "Plant," first and second districts, March, 1910	316.41	
Amount recovered through damage suit from Monongahela River Consolidated Coal and Coke Company for injury to barges, credited to "Plant," third district, March, 1910	346.46	
Amount received for damage to plant, credited to "Plant," fourth district, January, 1910	5.25	
Amount received by transfer settlement, credited to "Plant," fourth district, December, 1909	29.41	

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Amount received from sales of engineer property under the provisions of section 5 of river and harbor act of June 13, 1902, and sales of blueprints:		
By secretary—		
From sales of condemned engineer property, credited to "Mississippi River Commission" ($1.50) and "dredges and dredging" ($188.09), December, 1909	$189.59	
By first and second districts officer—		
From sale of U. S. S. *Unique* and outfit, credited to "Plant," July, 1909	300.00	
By third district officer—		
From sales of condemned engineer property, credited to "Plant," September, 1909	81.50	
From sales of condemned engineer property, credited to "Plant," October, 1909	387.25	
By fourth district officer—		
From sales of condemned engineer property, credited to "Plant," August, 1909	258.50	
From sales of blue prints, credited to allotments indicated in months named—		
July, 1909, "Surveys, gauges, and observations" ($2.25) and "Lower Tensas levee district" (25 cents)	2.50	
October, 1909, "Surveys, gauges, and observations"	.25	
January, 1910, "Surveys, gauges, and observations"	1.00	
March, 1910, "Surveys, gauges, and observations"	.60	
April, 1910, "Surveys, gauges, and observations"	1.25	
Total miscellaneous receipts		$39,555.59
Total		63,514,248.59

EXPENDED.

Location and object.	To June 30, 1909.	During year ending June 30, 1910.	Total.
Mississippi River Commission	$863,367.85	$34,551.63	$897,919.48
Surveys, gauges, and observations	[a] 2,488,948.53	63,328.65	2,552,277.18
Levees	[b] 23,902,520.00	851,251.71	24,753,771.71
Revetment and contraction works, permanent channel improvements, and protection	[c] 12,567,328.58	454,248.70	13,021,577.28
Dredges and dredging	[d] 4,889,697.15	417,071.78	5,306,768.93
Experimental dikes	100,000.00	.....	100,000.00
Plant and miscellaneous	[e] 3,294,513.76	242,809.17	3,537,322.93
Improving harbors and tributaries except Vicksburg Harbor	7,133,819.53	228,830.75	7,362,650.28
Improving Vicksburg Harbor	582,980.98	.....	582,980.98
Works above Cairo	737,632.53	.....	737,632.53
Total expended	56,560,808.91	2,292,092.39	58,852,901.30
Balance unexpended June 30, 1910	.....	.....	1,140,347.29
Allotments available July 1, 1910	.....	.....	3,497,000.00
Unallotted	.....	.....	24,000.00
Total appropriated, etc	.....	.....	63,514,248.59

[a] The amount, $2,921,198.19, reported in Annual Report for 1909, is reduced $432,249.66 erroneously reported as expended under this allotment instead of allotments for "Levees."

[b] The amount, $23,470,273.10, reported in Annual Report for 1909, is reduced $2.76 on account of error in financial statement of first and second districts officer for August, 1908, and increased $432,249.66 erroneously included in expenditures under "Surveys, gauges, and observations."

[c] The amount, $12,567,328.83, reported in Annual Report for 1909, is reduced 25 cents on account of refundment by first and second districts officer in July, 1909, of overpayment from allotment for "Plum Point reach."

[d] The amount, $4,889,699.82, reported in Annual Report for 1909, is reduced $2.67 on account of refundment by secretary in January, 1910, of overpayment from allotment for "Dredges and dredging."

[e] The amount, $3,294,513.94, reported in Annual Report for 1909, is reduced 18 cents on account of refundment by first and second districts officer in September, 1909, of overpayment from allotment for "Plant."

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Appropriations for gauging waters of the Mississippi River and its tributaries.

Allotments from general appropriations for examinations, surveys, and contingencies of rivers and harbors by acts of—	
March 3, 1871 (allotment Apr. 11, 1871)	$5,000.00
June 10, 1872 (allotment July 11, 1872)	5,000.00
March 3, 1873 (allotment May 17, 1873)	5,000.00
June 23, 1874 (allotment July 29, 1874)	5,000.00
March 3, 1875 (allotment Mar. 22, 1875)	5,000.00
Specific appropriations by river and harbor acts of—	
August 14, 1876	5,000.00
June 18, 1878	5,000.00
March 3, 1879	5,000.00
June 14, 1880	5,000.00
March 3, 1881	5,000.00
August 2, 1882	5,000.00
Deficiency act of March 12, 1884	2,100.00
Specific appropriations by river and harbor acts of—	
July 5, 1884	5,000.00
August 5, 1886	5,000.00
Allotted from specific appropriation by river and harbor act of August 11, 1888 (allotment October 17, 1888)	8,700.00
Deficiency act of October 19, 1888	3,600.00
Allotments from permanent indefinite appropriation made by section 6 of river and harbor act of August 11, 1888, for fiscal years, viz:	
1890 (allotment August 23, 1889)	9,000.00
1891 (allotment August 19, 1890, $8,700, less $3,518.34 withheld in United States Treasury under ruling that only $6,000 can be expended each fiscal year)	5,181.66
1892 (allotment July 17, 1891)	5,100.00
1893 (allotment July 15, 1892)	5,500.00
1894 (allotment July 18, 1893)	5,500.00
1895 (allotment June 5, 1894)	5,500.00
1896 (allotment June 4, 1895)	5,500.00
1897 (allotment May 13, 1896)	5,500.00
1898 (allotment June 16, 1897)	5,500.00
1899 (allotments May 27, 1898, $5,500; July 12, 1898, $500)	6,000.00
1900 (allotment June 1, 1899)	5,500.00
1901 (allotment July 2, 1900)	6,000.00
1902 (allotment July 31, 1901)	6,000.00
Allotments from permanent annual appropriation made by section 6 of river and harbor act of August 11, 1888, as amended by section 9 of river and harbor act of June 13, 1902, for fiscal years, viz:	
1903 (allotment July 23, 1902, $9,600, less $500 allotted Aug. 2, 1902, to St. Paul, Minn., district)	9,100.00
1904 (allotment Apr. 18, 1903)	9,100.00
1905 (allotment Aug. 11, 1904)	9,100.00
1906 (allotment June 30, 1905)	9,100.00
1907 (allotment July 2, 1906)	9,100.00
1908 (allotment July 24, 1907)	9,100.00
1909 (allotment July 3, 1908)	9,100.00
1910 (allotment July 13, 1909)	9,100.00
Total	227,981.66

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EXPENDED.

	To June 30, 1909.	During year ending June 30, 1910.	Total.
Expenditures	$203,894.16	$8,735.60	$212,629.76
Unexpended balances reverted to Treasury	[a] 13,103.58	263.37	13,366.95
Total	216,997.74	8,998.97	225,996.71
Unexpended balance June 30, 1910			1,984.95
Total appropriated, etc			227,981.66

[a] The amount, $13,106.83, reported in Annual Report for 1909, has been reduced $3.25, paid by Treasury Settlement No. 9268, September 14, 1909, from unexpended balance of allotment for 1908, previously reported as reverted to Treasury.

Appropriation for repairing government levee at Walnut Bend, Ark.[a]

Act of June 13, 1902 (river and harbor)	$90,000.00
Expended to June 30, 1906	90,000.00

Appropriation for waterway from Lockport, Ill., to St. Louis, Mo.

Act of June 13, 1902 (river and harbor)		$25,000.00
Amount transferred from allotment for "Survey of Illinois and Des Plaines rivers, Ill.," as reimbursement		1,093.40
Total		26,093.40
Expended to June 30, 1906	$22,291.23	
Unexpended balance carried to surplus fund on June 30, 1909, under the provisions of section 10 of sundry civil act of March 4, 1909	3,802.17	
		26,093.40

Appropriation for emergencies in river and harbor works.

Allotments from appropriation by act of April 28, 1904—	
For Wolf River (allotment July 6, 1904)	$8,000.00
For Giles Bend, Miss. (allotment July 6, 1904)	40,000.00
	48,000.00
Expended in fiscal year 1905	48,000.00
Allotments from appropriation by act of March 3, 1905—	
For Old River (allotments October 5, 1908, $6,000, and November 12, 1908, $4,000)	10,000.00
Expended in fiscal year 1909	10,000.00

Appropriation for examinations, surveys, and contingencies of rivers and Harbors.

Allotments from appropriation by river and harbor act of March 3, 1905—	
For Ashport, Tenn. (allotments March 29, 1905, $25, and May 8, 1905, $460)	$485.00
Expended in fiscal year 1906	485.00

[a] Prior to June 30, 1906, was reported under appropriation for "Improving Mississippi River."

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Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1910.

SECRETARY, MISSISSIPPI RIVER COMMISSION.

[Appropriations: Improving Mississippi River; gauging waters of the Mississippi River and its tributaries; waterway from Lockport, Ill., to St. Louis, Mo.]

	Appropriation for improving Mississippi River, allotment for—				
	Mississippi River Commission.	Surveys, gauges, and observations.	Dredges and dredging.	Expended allotments.	Total.
Amount expended on previous projects	$238,110.74	$855,247.37			$1,093,358.11
Amount expended on present project to end of last fiscal year	625,257.11	1,243,455.87	$4,499,093.04	[a] $46,131.14	6,413,937.16
Balance unexpended at end of last fiscal year	28,025.64	58,101.48	527,741.48		613,868.60
Amount appropriated or allotted since (net)	[b] 42,501.50	[c] 65,081.60	[d] 397,254.95		504,838.05
	70,527.14	123,183.08	924,996.43		1,118,706.65
Amount expended from beginning of present fiscal year to end of previous month	32,610.68	47,026.58	402,276.41		481,913.67
Amount expended during the month	[e] 1,940.95	4,363.65	[f] 14,795.37		21,099.97
	34,551.63	51,390.23	417,071.78		503,013.64
Balance unexpended at end of month	35,975.51	71,792.85	507,924.65		615,693.01
In Treasury United States	35,663.65	66,233.10	436,670.26		538,567.01
In hand	311.86	5,559.75	71,254.39		77,126.00
	35,975.51	71,792.85	507,924.65		615,693.01
Outstanding liabilities at end of month	1,754.55	1,946.91	14,550.84		18,252.30
Amount covered by existing contracts at end of month			77,010.30		77,010.30
	1,754.55	1,946.91	91,561.14		95,262.60
Balance available at end of month	34,220.96	69,845.94	416,363.51		520,430.41

[a] Experimental dikes, $45,075.58; patrol of the Mississippi River, $1,055.56.

[b] Amount previously reported increased $35,000
[c] Amount previously reported increased $65,000
[d] Amount previously reported increased $380,000

Allotments from appropriation by sundry civil act, approved June 25, 1910, by resolution of the Mississippi River Commission, April 20, 1910 (Proc. p. 1589), approved by the Assistant Secretary of War April 30, 1910. (ED 15927-266, Sec. MRC 223-37.)

[e] Includes $41.58 in Treasury settlement No. 11685, June 22, 1910, with Louisville and Nashville Railroad Company for passenger transportation. (ED 24271-1346, Sec. MRC 41-95.)
Includes 74 cents in Treasury settlement No. 11684, June 22, 1910, with Missouri Pacific Railway Company for freight transportation. (ED 10973-10993, Sec. MRC 81-99.)

[f] Includes $63.93 in Treasury settlement No. 11576, June 7, 1910, with St. Louis and San Francisco Railroad Company for freight transportation. (ED 23977-141, Sec. MRC 139-73.)
Includes $98.25 in Treasury settlement No. 11561, June 6, 1910, with Illinois Central Railroad Company for freight transportation. (ED 8747-1337, Sec. MRC 100-278.)
Includes $140.15 in Treasury settlement No. 11609, June 10, 1910, with Missouri Pacific Railway Company for freight transportation. (ED 10973-10948, Sec. MRC 81-98.)

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Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1910—Continued.

SECRETARY, MISSISSIPPI RIVER COMMISSION—continued.

	Appropriation for gauging waters of the Mississippi River and its tributaries.	Expended appropriation.	Grand total.
Amount expended on previous projects			$1,093,358.11
Amount expended on present project to end of last fiscal year	$203,894.16	[a] $22,291.23	6,640,122.55
Balance unexpended at end of last fiscal year	[b] 1,883.92		615,752.52
Amount appropriated or allotted since (net)	9,100.00		513,938.05
	10,983.92		1,129,690.57
Amount expended from beginning of present fiscal year to end of previous month	[c] 7,611.86		489,525.53
Amount expended during the month	1,123.74		22,223.71
	8,735.60		511,749.24
Balance unexpended at end of month	[d] 1,984.95		617,677.96
In Treasury United States	500.00		539,067.01
In hand	1,484.95		78,610.95
	1,984.95		617,677.96
Outstanding liabilities at end of month	1,476.89		19,729.19
Amount covered by existing contracts at end of month			77,010.30
	1,476.89		96,739.49
Balance available at end of month	508.06		520,938.47

[a] Waterway from Lockport, Ill., to St. Louis, Mo. Unexpended balance of $3,802.17, carried to surplus fund June 30, 1909, under the provisions of section 10 of sundry civil act of March 4, 1909. (ED 46863–142, Sec. MRC 1125–9.)

[b] The amount, $1,880.67, previously reported during the fiscal year has been increased $3.25, paid by Treasury settlement No. 9268, September 14, 1909, from unexpended allotment for 1908, previously reported as reverted to Treasury.

[c] Includes $3.25 from allotment for 1908.

[d] $263.37 of the unexpended balance for 1909 reverts to the Treasury.

WORKS ABOVE CAIRO.

[Appropriation: Improving Mississippi River.]

	Protection near Cairo.[a]	De Moines Rapids to Ohio River.	Total.
Amount expended on present project to end of last fiscal year	$50,000.00	$687,632.53	$737,632.53

[a] Includes only work under act of July 5, 1884.

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Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1910—Continued.

FIRST AND SECOND DISTRICTS.

[Appropriations: Improving Mississippi River; repairing government levee at Walnut Bend, Ark.; emergencies in river and harbor works; examinations, surveys, and contingencies of rivers and harbors.]

	Improving Mississippi River, allotment for—					
	Surveys	Upper St. Francis levee district.	Lower St. Francis levee district.	White River levee district.	Reelfoot levee district.	Chute of Island 26 (abattis dikes).
Amount expended on present project to end of last fiscal year	$136,676.20	$374,378.48	$1,758,383.71	$1,959,317.90	$170,000.00	$1,478.11
Balance unexpended at end of last fiscal year	1,987.66	421.52	12,291.71	.....	.....	(a)
Amount appropriated or allotted since (net)	2,500.00	65,000.00	74,776.56	28,212.06	10,000.00	.....
	4,487.66	65,421.52	87,068.27	28,212.06	10,000.00	.....
Amount expended from beginning of present fiscal year to end of previous month	3,988.88	26,500.87	65,552.60	26,030.09	979.35	.....
Amount expended during the month	85.65	1,743.70	1,850.13	1,230.33	1.10	.....
	4,074.53	28,244.57	67,402.73	27,260.42	980.45	.....
Balance unexpended at end of month	413.13	37,176.95	19,665.54	951.64	9,019.55	.....
In Treasury United States	.....	27,000.00	13,002.76	.....	5,000.00	.....
In hand	413.13	10,176.95	6,662.78	951.64	4,019.55	.....
	413.13	37,176.95	19,665.54	951.64	9,019.55	.....
Outstanding liabilities at end of month	213.13	300.00	300.00	951.64	150.00	.....
Amount covered by existing contracts at end of month	.....	30,683.26	9,195.04	.....	8,393.38	.....
	213.13	30,983.26	9,495.04	951.64	8,543.38	.....
Balance available at end of month	200.00	6,193.69	10,170.50	.....	476.17	.....

(a) Unexpended balance of $13,914.41 transferred to the allotment for Hopefield Bend by resolution of Mississippi River Commission, June 25, 1909 (Proc., p. 1503), approved by the Acting Secretary of War July 8, 1909. (ED 15927–246, Sec. MRC 124–19.)

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Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1910—Continued.

FIRST AND SECOND DISTRICTS—continued.

	Improving Mississippi River, allotment for—					
	Plum Point reach.	Walnut Bend, Ark.	Old Town Bend, Ark.	Plant.	At New Madrid, Mo.	Caruthersville, Mo.
Amount expended on present project to end of last fiscal year	$5,499,251.99	$188,822.20	$193,865.96	$1,389,951.80	$151,297.86	$80,227.86
Balance unexpended at end of last fiscal year	8,661.04	2,866.39	152.85	22.92	1,702.14	86.51
Amount appropriated or allotted since (net)	56,348.77	31,710.87	78,899.24	70,616.41	.....	.....
	65,004.81	34,577.26	79,052.09	70,639.33	1,702.14	86.51
Amount expended from beginning of present fiscal year to end of previous month	51,078.92	32,644.85	70,900.08	61,090.08	.....	86.51
Amount expended during the month	596.19	288.00	434.00	7,270.98	.....	.....
	51,675.11	32,932.85	71,334.08	68,361.06	.....	86.51
Balance unexpended at end of month	13,329.70	1,644.41	7,718.01	2,278.27	1,702.14	.....
In Treasury United States	10,000.00	922.72	6,952.69	.....	1,320.85	.....
In hand	3,329.70	721.69	765.32	2,278.27	381.29	.....
	13,329.70	1,644.41	7,718.01	2,278.27	1,702.14	.....
Outstanding liabilities at end of month	1,000.00	300.00	2,000.00	2,278.27	.....	.....
Amount covered by existing contracts at end of month	4,312.50	1,000.00	5,000.00	.....	.....	.....
	5,312.50	1,300.00	7,000.00	2,278.27	.....	.....
Balance available at end of month	8,017.20	344.41	718.01	.....	1,702.14	.....

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Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1910—Continued.

FIRST AND SECOND DISTRICTS—continued.

	Improving Mississippi River, allotment for—				
	Hopefield Bend (preservation of works at).	Expended allotments.	Total.	Expended appropriations.	Grand total.
Amount expended on present project to end of last fiscal year.	$454,510.11	[a]$3,937,499.65	$16,295,661.83	[b]$98,485.00	$16,394,146.83
Balance unexpended at end of last fiscal year	18,720.35	.....	46,913.09	.....	46,913.09
Amount appropriated or allotted since (net)	37,990.64	.....	456,049.55	.....	456,049.55
	56,710.99	.....	502,962.64	.....	502,962.64
Amount expended from beginning of present fiscal year to end of previous month	45,724.15	.....	384,576.38	.....	384,576.38
Amount expended during the month	1,343.56	.....	14,843.64	.....	14,843.64
	47,067.71	.....	399,420.02	.....	399,420.02
Balance unexpended at end of month	9,643.28	.....	103,542.62	.....	103,542.62
In Treasury United States	5,749.87	.....	69,948.89	.....	69,948.89
In hand	3,893.41	.....	33,593.73	.....	33,593.73
	9,643.28	.....	103,542.62	.....	103,542.62
Outstanding liabilities at end of month	2,000.00	.....	9,493.04	.....	9,493.04
Amount covered by existing contracts at end of month	6,000.00	.....	64,584.18	.....	64,584.18
	8,000.00	.....	74,077.22	.....	74,077.22
Balance available at end of month	1,643.28	.....	29,465.40	.....	29,465.40

[a] Preservation of works, $54,867.89; Walnut Bend levee, preservation of works at, $28,200; removal of Nonconnah Rock, $9,000; dredges and dredging, $388,097.12; Columbus, Ky., $43,750; improving St. Francis River (Walnut Bend levee), $75,000; at Memphis, Tenn., $45,000; improving harbor at Memphis, Tenn., $1,425,038.77; improving harbor at Memphis, Tenn. (Wolf River), $45,000; dikes, $54,924.42; at Memphis, Tenn. (Wolf River), $25,786; Upper Yazoo levee district $1,428,703.45; at Hickman, Ky., $95,182; at Helena, Ark., $219,000.

[b] Repairing government levee at Walnut Bend, Ark., $90,000; emergencies in river and harbor works (for Wolf River), $8,000; examinations, surveys, and contingencies of rivers and harbors $485.

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Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1910—Continued.

THIRD DISTRICT.

[Appropriation: Improving Mississippi River.]

	Improving Mississippi River, allotment for—				
	Surveys, gauges, and observations.	Lower Yazoo levee district.	Upper Tensas levee district.	Lake Bolivar front.	Panther Forest, Ark.
Amount expended on present project to end of last fiscal year	$126,423.67	$4,342,117.37	$5,446,979.98	$259,881.81	$58,311.42
Balance unexpended at end of last fiscal year	.....	61,374.50	90,677.82	25,850.25	11,688.58
Amount appropriated or allotted since (net)	5,000.00	110,000.00	130,000.00	.....	.....
	5,000.00	171,374.50	220,677.82	25,850.25	11,688.58
Amount expended from beginning of present fiscal year to end of previous month	4,498.93	77,974.77	153,358.75	25,850.25	11,625.05
Amount expended during the month	359.61	8,291.30	3,729.88	.....	63.53
	4,858.54	86,266.07	157,088.63	25,850.25	11,688.58
Balance unexpended at end of month	141.46	85,108.43	63,589.19	.....	.....
In Treasury United States	.....	76,999.43	58,000.00	.....	.....
In hand	141.46	8,109.00	5,589.19	.....	.....
	141.46	85,108.43	63,589.19	.....	.....
Outstanding liabilities at end of month	141.46	200.00	400.00	.....	.....
Amount covered by existing contracts at end of month	.....	49,000.00	56,200.00	.....	.....
	141.46	49,200.00	56,600.00	.....	.....
Balance available at end of month	.....	35,908.43	6,989.19	.....	.....

	Improving Mississippi River, allotment for—				
	Leland Neck, Ark.	Vaucluse, Ark.	Fitlers Bend.	Reid-Bedford Bend.	Stone.
Amount expended on present project to end of last fiscal year	.....	$61,201.61	$62,898.23	$174,579.23	$419,702.91
Balance unexpended at end of last fiscal year	.....	8,798.39	34,649.54	15,468.54	4,440.16
Amount appropriated or allotted since (net)	$105,000.00	.....	.....	.....	.....
	105,000.00	8,798.39	34,649.54	15,468.54	4,440.16
Amount expended from beginning of present fiscal year to end of previous month	104,525.38	3,428.83	34,516.32	15,321.61	4,440.16
Amount expended during the month	474.62	4,288.38	133.22	146.93	.....
	105,000.00	7,717.21	34,649.54	15,468.54	4,440.16
Balance unexpended at end of month	.....	1,081.18	.....	.....	.....
In Treasury United States	.....	.....	.....	.....	.....
In hand	.....	1,081.18	.....	.....	.....
	.....	1,081.18	.....	.....	.....
Outstanding liabilities at end of month	.....	1,081.18	.....	.....	.....
Amount covered by existing contracts at end of month	.....	.....	.....	.....	.....
	.....	1,081.18	.....	.....	.....
Balance available at end of month	.....	.....	.....	.....	.....

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Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1910—Continued.

THIRD DISTRICT—continued.

	Improving Mississippi River, allotment for—				
	General repairs to existing works.	Plant.	Greenville, Miss.	Expended allotments.	Total.
Amount expended on present project to end of last fiscal year	(a)	$1,344,989.28	$985,621.50	[b]$5,426,357.20	$18,709,064.21
Balance unexpended at end of last fiscal year	$30,099.29	34,998.86	16,168.71		334,214.64
Amount appropriated or allotted since (net)	70,000.00	130,815.21			550,815.21
	100,099.29	165,814.07	16,168.71		885,029.85
Amount expended from beginning of present fiscal year to end of previous month	28,606.16	47,452.48	16,024.73		527,923.42
Amount expended during the month	10,513.87	[c]19,581.43	143.98		47,726.75
	[d]39,120.03	67,033.91	16,168.71		575,350.17
Balance unexpended at end of month	60,979.26	98,780.16			309,679.68
In Treasury United States	45,500.00	58,589.05			239,088.48
In hand	15,479.26	40,191.11			70,591.20
	60,979.26	98,780.16			309,679.68
Outstanding liabilities at end of month	12,400.00	19,725.00			33,947.64
Amount covered by existing contracts at end of month	48,579.26	76,600.00			230,379.26
	60,979.26	96,325.00			264,326.90
Balance available at end of month		2,455.16			45,352.78

[a] Amount expended during the fiscal year 1909, distributed to following works: Lake Providence reach $2,935.42; plant, $10,397.48.

[b] Improving harbor at Vicksburg, Miss., $442,724.77; Delta Point, La., $186,256.21; Ashbrook Neck, $703,547.77; Longwood, Miss., $157,010.28; Lake Providence reach, $3,936,818.17.

[c] Includes $1.14 in Treasury settlement No. 11518 for passenger transportation.
Includes $7.11 in Treasury settlement No. 11625 for passenger transportation.
Includes $19,100 in Treasury transfer settlement No. 11640; transferred to appropriation for improving Mississippi River, mouth of Ohio River to Minneapolis, Minn., to cover cost of 6 barges built by Rock Island district.

[d] Amount expended during the fiscal year 1910, distributed to following works:

Upper Tensas levee district (Redfork revetment)	$1,093.03
Lake Bolivar front	8,354.82
Ashbrook Neck	1,580.19
Panther Forest	1,307.26
Leland Neck	4.88
Lake Providence reach	129.78
Fitlers Bend	8.00
Reid-Bedford Bend	19,404.44
Plant, third district	12,237.63
Total	39,120.03

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Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1910—Continued.

FOURTH DISTRICT.

[Appropriations: Improving Mississippi River; emergencies in river and harbor works.]

	Improving Mississippi River, allotment for—					
	Surveys, gauges, and observations.	Lower Tensas levee district.	Atchafalaya levee district.	Lafourche levee district.	Barataria levee district.	Pontchartrain levee district.
Amount expended on present project to end of last fiscal year	$127,145.42	$3,255,891.62	$1,666,152.66	$672,551.06	$449,461.84	$1,766,907.79
Balance unexpended at end of last fiscal year	.....	381,090.68	3,957.00	.....	25,271.03	8,926.94
Amount appropriated or allotted since (net)	3,005.35	100,000.25	.....	.....	.....	40,000.00
	3,005.35	481,090.93	3,957.00	.....	25,271.03	48,926.94
Amount expended from beginning of present fiscal year to end of previous month	2,973.53	394,068.24	3,957.00	.....	25,003.21	22,159.13
Amount expended during the month	31.82	19,164.79	.....	.....	267.82	10,194.38
	3,005.35	413,233.03	3,957.00	.....	25,271.03	32,353.56
Balance unexpended at end of month	.....	67,857.90	.....	.....	.....	16,573.38
In Treasury United States	.....	47,002.50	.....	.....	.....	12,000.00
In hand	.....	20,855.40	.....	.....	.....	4,573.38
	.....	67,857.90	.....	.....	.....	16,573.38
Outstanding liabilities at end of month	.....	.....	.....	.....	.....	40.42
Amount covered by existing contracts at end of month	.....	67,857.90	.....	.....	.....	6,724.34
	.....	67,857.90	.....	.....	.....	6,764.76
Balance available at end of month	.....	.....	.....	.....	.....	9,808.62

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Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1910—Continued.

FOURTH DISTRICT—continued.

	Improving Mississippi River, allotment for—					
	Lake Borgne levee district.	Bondurant.	Kempe Bend revetment.	Plant.	Natchez and Vidalia harbors, Miss. and La.	New Orleans Harbor, La.
Amount expended on present project to end of last fiscal year	$431,565.14	$63,000.00	$741,000.00	$558,517.12	$662,002.10	$458,751.75
Balance unexpended at end of last fiscal year	5,629.99					
Amount appropriated or allotted since (net)	6,000.00	5,000.00	65,000.00	106,293.16	50,000.00	100,000.00
	11,629.99	5,000.00	65,000.00	106,293.16	50,000.00	100,000.00
Amount expended from beginning of present fiscal year to end of previous month	6,164.78	3,805.65	59,897.20	82,839.54	50,000.00	99,438.65
Amount expended during the month	1,936.41	194.35	3,805.81	12,337.03		561.35
	8,101.19	4,000.00	63,703.01	95,176.57	50,000.00	100,000.00
Balance unexpended at end of month	3,528.80	1,000.00	1,296.99	11,116.59		
In Treasury United States						
In hand	3,528.80	1,000.00	1,296.99	11,116.59		
	3,528.80	1,000.00	1,296.99	11,116.59		
Outstanding liabilities at end of month	656.58		1,296.99			
Amount covered by existing contracts at end of month	2,872.22			11,116.59		
	3,528.80		1,296.99	11,116.59		
Balance available at end of month		1,000.00				

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Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1910—Continued.

FOURTH DISTRICT—continued.

	Improving Mississippi River, allotment for—				Expended appropriations.	Grand total.
	Atchafalaya and Red rivers, La.	Expended general allotments.	Expended specific allotments.	Total.		
Amount expended on present project to end of last fiscal year.	$58,100.28	a$136,506.99	b$2,263,601.80	$13,311,155.07	c$50,000.00	$13,361,155.07
Balance unexpended at end of last fiscal year	566.14			425,441.78		425,441.78
Amount appropriated or allotted since (net)	25,000.00			500,298.76		500,298.76
	25,566.14			925,740.54		925,740.54
Amount expended from beginning of present fiscal year to end of previous month	15,220.96			765,527.94		765,527.94
Amount expended during the month	286.86			48,780.62		48,780.62
	15,507.82			814,308.56		814,308.56
Balance unexpended at end of month	10,058.32			111,431.98		111,431.98
In Treasury United States	7,500.00			66,502.50		66,502.50
In hand	2,558.32			44,929.48		44,929.48
	10,058.32			111,431.98		111,431.98
Outstanding liabilities at end of month	527.06			2,521.06		2,521.06
Amount covered by existing contracts at end of month				88,571.06		88,571.06
	527.06			91,092.10		91,092.10
Balance available at end of month	9,531.26			20,339.88		20,339.88

a Preservation of works, $134,000; dredges and dredging, $2,506.99.
b Improving harbor at Natchez and Vidalia, Miss. and La., $282,252.04; improving harbor at New Orleans, La., $979,639.86; improving Atchafalaya and Red rivers, La., $1,001,709.40.
c Emergencies in river and harbor works. For Giles Bend, Miss., $40,000; for Old River, $10,000.

LIST OF APPENDIXES ACCOMPANYING THE ANNUAL REPORT OF THE MISSISSIPPI RIVER COMMISSION FOR THE FISCAL YEAR ENDING JUNE 30, 1910.

Appendix 1.

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APPENDIX 1.

REPORT OF FIRST LIEUT. C. H. KNIGHT, CORPS OF ENGINEERS, U. S. ARMY, SECRETARY MISSISSIPPI RIVER COMMISSION.

MISSISSIPPI RIVER COMMISSION,
OFFICE OF THE SECRETARY,
St. Louis, Mo., May 31, 1910.

COLONEL: I have the honor to submit the following report of operations under this office for the year ending May 31, 1910.

The works in charge of the secretary of the Mississippi River Commission have been carried on under allotments made by the Commission from appropriations for improving the Mississippi River from Head of the Passes to the mouth of the Ohio River, and under allotment for fiscal year from permanent appropriation provided by section 9 of the river and harbor act approved June 13, 1902, for gauging the waters of the Mississippi River and its principal tributaries.

The allotments from the first-named appropriation are as follows:

(1) *Mississippi River Commission.*—Available for salaries, clerical, office, traveling, and miscellaneous expenses of the Mississippi River Commission.

(2) *Surveys, gauges, and observations.*—Available for survey of the Mississippi River between the Head of the Passes and its headwaters, for the establishment and maintenance of gauges, for special surveys and examinations, and for the collection and reduction of physical data pertaining to the Mississippi River, and for the maintenance and repair of plant.

(3) *Dredges and dredging.*—Available for the construction, operation, maintenance, and repair of dredging plant for the Mississippi River from Head of the Passes to the mouth of the Ohio River.

The allotment from the permanent appropriation for gauging is available for paying salaries of gauge observers and other expenses incident to maintaining gauges at specified places on the Mississippi River and its tributaries.

MISSISSIPPI RIVER COMMISSION.

The Mississippi River Commission held three sessions during the year, as follows:

One hundred and ninth session, June 25–26, 1909, at St. Louis, Mo.

One hundred and tenth session, October 25–30, 1909, on board the U. S. steamer *Mississippi*, St. Louis, Mo., to New Orleans, La.

One hundred and eleventh session, April 12–21, 1910, on board the U. S. steamer *Mississippi*, St. Louis, Mo., to New Orleans, La.

The proceedings of these sessions have been printed and issued.

Plant and outfit.—This consists of the steamer *Mississippi*, which has been in service with the Commission on inspection trips as follows: Left West Memphis for the fall inspection trip October 17 and returned November 8, 1909. Left West Memphis for the spring inspection trip April 5 and returned April 30, 1910.

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During the intervals between trips this boat has been laid up and cared for at West Memphis, Ark., where the necessary repairs to keep her in serviceable condition have been made. The boat was docked and hull inspected at New Orleans April 23, 1910.

SURVEYS, GAUGES, AND OBSERVATIONS.

General survey of the Mississippi River.—This survey, authorized by the law creating the Mississippi River Commission to extend from the Head of the Passes near its mouth to its headwaters, has been made with a view of obtaining accurate data for topographical and hydrographical maps for use in study of the river in connection with planning improvements. The field work, comprising secondary triangulation, precise levels, topography, and hydrography, has been completed over the entire river, a distance of about 2,446 miles. The precise levels also extend down to the jetties, an additional distance of about 12 miles, to connect with the East Bay tide gauge. A summary of the survey to 1896 may be found in the Report of the Chief of Engineers for 1896, pages 3574 to 3576. The progress of the work since that date is given in the successive annual reports.

From the Passes to Keokuk, Iowa, the survey, in general, extends 1½ to 2 miles back from the river on either side. From Keokuk to St. Paul, Minn., the survey usually extends back to the bluffs, and is at a few places as much as 8 miles wide. Above St. Paul and Minneapolis the topography was usually limited to 1 mile or less on either side of the river. In general, adjacent lakes have been included in the survey.

Resurveys.—In order to ascertain what changes have occurred in the river below Cairo since the first general survey, the river has been resurveyed between its high-water banks, as follows: From Cairo to mouth of Arkansas River, 1902–1904; from Arkansas River to Vicksburg, 1894; from Vicksburg to New Orleans, 1895–1898; and from Forts St. Philip and Jackson, La., to the Head of the Passes in 1903–1904.

The results of the above resurveys from the mouth of the Arkansas River to New Orleans, and a comparison with the earlier surveys for that stretch of the river, have been published in the reports of the Chief of Engineers for 1896, pages 3577–3598, and 1897, pages 3672–3686. Those for the short stretch from the forts to the Head of the Passes were published in the supplement to Report of the Chief of Engineers for 1905, pages 41–45. Similar tables and diagrams of the elements of cross sections of the resurvey of 1902–1904, and of earlier surveys for comparison, of the stretch of the river from Cairo to the mouth of the Arkansas River, which have been in preparation in the drafting division for some time, are nearly completed, and a report thereon is being prepared.

Permanent marks.—Since the earlier surveys of the river a large number of the bench marks, which were intended to be permanent, have been disturbed or destroyed and many of them have caved into the river.

The systematic work of restoring old bench marks and establishing new ones was begun at Cairo in the fall of 1905. This work has been prosecuted during each low-water season since, and was completed to Donaldsonville, La., in January, 1910. The following is the work of this party during the last season in detail:

The party was organized early in October at Memphis and left that place on October 9, 1909, on the quarter boat *Illinois* in tow of the small steamer *Mars* with fuel barge. This party, in charge of Assistant Engineer A. T. Morrow, consisted of Junior Engineer E. J. Thomas, Surveyors F. A. Walton, E. B. Nettleton, W. H. Bainum, J. B. Moore, F. H. Wells, Recorder N. R. Sutton, 1 foreman, 7 survey men, 9 axmen, and boat's crew of 10 men, including pilot, steam engineer, stoker, deck hands, cooks, and waiters; making a total of 35 persons in the party.

Work was begun on October 18, 1909, at Greens Landing, 721 miles below Cairo, where the work of the previous season had closed, and was continued without interruption until January 15, 1910, when it was closed on secondary triangulation station North Base, about 2 miles below Donaldsonville, La., or 890 miles below Cairo.

A system of tertiary triangulation adjusted to the original secondary system was carried down the river for locating the survey marks. Base lines were measured on an average of one for every 15 triangles; a 200-foot steel tape, formerly used on secondary triangulation, was used for this work. Azimuth observations were made about every 20 triangles, except where it could be determined from the old secondary marks. Ordinary levels were carried down the

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river connecting with the precise level bench marks, and all elevations are referred to mean Gulf level.

About 170 miles of river was covered during the season, 146 old bench marks were redetermined, 40 old secondary stations were connected with, 94 new marks were established, and 416 triangles in main system and 119 side triangles were closed.

About 75 per cent of the secondary triangulation stations connected with had subsurface marks only, consisting of glass bottles or earthenware jars which were uncovered by digging. Standard tile and pipe marks were placed at these stations, the original marks not being disturbed except in a few cases where they were not deep enough to admit of setting the new marks.

The bank and bar lines were determined over this stretch of the river and amounted to 399 miles.

At the conclusion of work at Donaldsonville the party disbanded. Assistant Engineer Morrow, with Surveyor Walton, returned with the tow to West Memphis. The outfit stopped at all the regular gauge stations between Donaldsonville and Memphis, except Mhoon Landing, and made a brief inspection, which mainly consisted of leveling to the gauge section in use at the time.

The total cost of the season's field work was $9,148.35, or $53.81 per mile of river.

After returning to the office Assistant Engineer Morrow, assisted by Surveyors F. A. Walton and E. B. Nettleton, began the reduction of the season's field notes. This work is now about 40 per cent completed.

The reduction of the previous season's field notes was completed in October, 1909.

Precise levels.—On account of certain discrepancies in the precise levels of earlier years on the lower river, the line was rerun from Baton Rouge, La., to the jetties in 1897–98. Since that time this work has been extended northward to Memphis, Tenn. The line from Biloxi, Miss., to New Orleans, La., has also been rerun. No field work was done during the season of 1909–10. It is the intention to relevel between Cairo and Memphis next season.

Reduction and plotting of the general survey.—The reduction and plotting of the field notes of the upper river survey, season of 1904, were completed, with the exception of a short strip just below Itasca Park.

Mapping.—Detail charts Nos. 252 to 261 above Minneapolis, Minn., scale 1:5000 were completed ready for publication.

Detail charts Nos. 262 to 267, of the same series, are well advanced toward completion.

The office force in the drawing division during the year consisted of Messrs. K. A. Widen, H. A. H. d'Ailly, C. R. Appiano, Paul Burgoldt, draftsmen, and Mr. C. W. Clark, assistant engineer in charge of this division.

Published maps and charts.—No maps or charts have been published during the year.

Maps and charts published by the Commission are as follows:

Map of the Lower Alluvial Valley of the Mississippi River from the vicinity of Cairo to the Gulf of Mexico in eight sheets, scale 1 inch: 5 miles, first published in 1887, and a third edition with additional data published in 1908.

Map of the valley of the Mississippi River from Cairo to St. Paul in four sheets, scale 1 inch: 5 miles, published in 1899.

District map of the Mississippi River from Cairo to the Gulf, showing the improvement and levee districts, in one sheet, scale 1 inch : 5 miles, published in 1897.

Detail charts, 170 in number, scale 1: 20,000, and 4 index and 2 title sheets, showing hydrography of the river and adjacent topography, from the Gulf to Minneapolis, Minn., a distance of 1,957 miles.

Detail charts 1: 10,000, otherwise similar to the above, from Minneapolis, Minn., to Lake Itasca, are in preparation and 51 sheets, extending from Minneapolis to above Leech Lake River, 1,265.5 miles above Cairo, have been published.

Map of the Mississippi River, scale 1 inch : 1 mile, in 77 sheets, from the Gulf of Mexico to 1½ miles above Grand Rapids, Minn., 1,215 miles above Cairo; this series is to be extended up to the source of the river. A title page, index, and cover for the sheets below Cairo have also been printed.

Map of New Orleans and vicinity, in 4 sheets, showing Fort Chalmette, similar to the detail charts described above, but on a scale of 1: 10,000.

Map of Lake Itasca Basin, in colors, scale of 1: 15,000, in 1 sheet.

Map of the St. Francis Basin, scale one-half inch to 1 mile, in 2 sheets. Republished in 1908 with additional data.

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Gauges.—The gauges in charge of this office comprise 38 regular gauges on the Mississippi River and its principal tributaries and 185 special high-water gauges on the Mississippi River between Cairo and the Head of the Passes. Also two automatic tide gauges on the Gulf of Mexico, one at Biloxi, Miss., and one at East Bay, La. A detailed description of these gauges is printed in the supplement to Report of the Chief of Engineers, U. S. Army, for 1902, pages 52 to 59.

All of the regular gauges were inspected and repaired during the last low-water season with the exception of that at Cape Girardeau, Mo. Owing to the limited amount of funds available this year for the Commission gauges, only urgent repairs were made to these gauges and the low-water inspection trip on the main river was made as brief as possible.

The high-water gauges below Cairo were known to be in fair condition generally, and except in a few cases where the observers had reported the gauge disturbed, were not inspected. Some inexpensive float gauges were made, having a simple device to fix the float at the maximum stage. Seven of these experimental gauges were set at the sites of as many high-water gauges between Mhoon Landing, Miss., and Natchez, Miss., for the purpose of a practical test; the results will be known after the next inspection.

As there has been practically no high water so far this year, the high-water inspection of the gauges on the main river below Cairo was not begun until May 12. It is expected that the mid-sections of the gauges can be inspected on this trip and left in good condition for the summer. The following is the work in detail:

The low-water inspection of all the regular gauges on the Mississippi River from Memphis, Tenn., to Fort Jackson, La., the gauge at Barbre Landing and the tide gauge at East Bay, La., was made by the party on the U. S. steamer *Patrol*, in charge of Junior Engineer T. B. Perry, with Surveyors R. A. Brown and E. L. Perry and crew. The steamer left Memphis on October 14, 1909, and returned on November 27, 1909, and was laid up at West Memphis.

The severe storm from the Gulf in September, 1909, had disturbed many of the gauges on the lower river, and at the inspection the following large errors were found in the disturbed sections: Red River Landing, La., gauge was 2.2 feet high; Bayou Sara, La., gauge was 0.7 foot low; Donaldsonville, La., gauge was 2.3 feet low.

Some of the gauges above the influence of the Gulf storm had also been disturbed from various causes, the larger errors being as follows: Helena, Ark., gauge 2.1 feet low, disturbed by transfer boat; Sunflower Landing, Miss., 0.9 foot low, sliding bank; Arkansas City, Ark., 0.9 foot high, knocked by logs and rafts. Errors found in gauge sections at other stations were generally less than two or three tenths foot. All of the disturbed sections were rebuilt correctly.

All the gauges were tested by duplicate lines of ordinary levels from the permanent bench marks at the respective stations. New steel bulletin frames of the latest type were erected at Greenville, Miss., and Sunflower Landing, Miss. The bulletins at the other stations were repainted where necessary and left in fair condition.

Nine of the high-water gauges were visited and repaired and two new high-water gauge observers were appointed. One of the experimental float gauges was set at each of the following high-water gauges: Nos. 64, 67, 81, 82, 88, 102, and 132.

After laying up the *Patrol* at West Memphis Junior Engineer Perry inspected and repaired the regular gauges on the Mississippi River at Cottonwood Point, Mo., New Madrid, Mo., Columbus, Ky., and Cairo, Ill., using the small steamboats engaged on bar surveys for the purpose. This work was completed at Cairo on December 3, 1909.

The regular gauge at Fulton, Tenn., was inspected and repaired during the low water by Surveyor J. H. Opp, on the small steamer *Vulcan*.

All the gauges on the tributaries were inspected during the low water of 1909, as follows: On the Ohio River at Louisville, Ky., August 6; on the Tennessee River at Florence, Ala., November 4; on the Cumberland River at Nashville, Tenn., November 5, by Assistant Engineer Kivas Tully. On the Red River at Shreveport, La., November 3; at Alexandria, La., November 4; and at Fulton, Ark., November 26; on the Arkansas River at Little Rock, Ark., November 27; on the White River at Clarendon, Ark., November 24; and at Jacksonport, Ark., November 28, by Surveyor R. A. Brown. On the St. Francis River at the Iron Mountain railroad bridge, November 29, by Surveyor E. L. Perry. These gauges

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were repaired and both gauges and bulletin frames were repainted where necessary and kept in good condition.

The regular gauge on the Mississippi River at St. Louis, Mo., was inspected by Surveyor F. E. Early, and a temporary section reading from zero to 5 feet was set on December 23, 1909.

On the night of January 18, 1910, the river rose suddenly from 27 feet to 31.9 feet on the gauge, and as suddenly fell again. This was due to the breaking of an ice gorge in the Missouri River and caused great damage to floating property on the river front at St. Louis. Two barges were stranded on the levee at the site of the inclined gauge, and it was necessary to set a temporary gauge to obtain the readings until the river fell below the barges. This gauge and its bench marks were connected with permanent bench mark 15 on the Eads Bridge by a duplicate line of precise levels on January 28, 1910, by Junior Engineer E. J. Thomas. The results indicate a slight settlement in the gauge benchmark on the elevated railway strut, but no change in the steel-concrete inclined gauge.

Five steel bulletins for displaying the gauge readings to boats passing the gauge stations were made under contract by the Henry Vogt Machine Company, of Louisville, Ky. These are of the same type shown on plate 3 of the annual report of the Mississippi River Commission for 1903, following page 68 of supplement to report of Chief of Engineers. The only change made this year was to have blank plates attached to the land side of the plate frames, so that the reverse side of the figured plates are not visible.

The usual office work tabulating and plotting the gauge records has been performed and corrections for errors in gauges as deduced from the inspectors' level notes or from coordinate plots have been applied.

The hourly ordinates of the tide gauges at Biloxi, Miss., and East Bay, La., have been scaled off the tide sheets and tabulated.

The highest and lowest gauge readings, Mississippi River and tributaries, for 1909 and the extreme readings prior to 1909 are given in Table No. 1.

The hydrographs of the daily readings of all the regular gauges on the Mississippi River from Cairo, Ill., to Fort Jackson, La., June 1, 1909, to May 31, 1910, are given on plate No. 1.

The annual pamphlet of river stages for the year 1909 has been prepared and the printing is nearly completed. This pamphlet contains the records of 67 gauges and comprises about 152 pages.

The annual hydrographs of the Mississippi River and tributaries for 1909 have been prepared in four sheets and blueprints issued.

The Mississippi River did not reach the stages prescribed for slope observations during either high or low water periods during the year, and therefore no observations were made except on the regular gauges.

Discharge observations.—The Mississippi River reached the stage prescribed for high-water discharge observations at St. Louis, Mo., and Thebes, Ill., in July, 1909.

The discharge at St. Louis was measured by a party in charge of Junior Engineer E. J. Thomas, with Surveyors J. G. Frost, W. W. Primm, and E. De Lorme, on the U. S. tender *No. 4*, loaned by the St. Louis engineer district, from July 12 to 20, 1909.

The discharge at Thebes was measured from July 14 to 21 by a party in charge of Junior Engineer T. B. Perry, with Surveyors R. A. Brown and C. W. Schweizer, on the U. S. tender *No. 8*, also loaned by the St. Louis engineer district.

These observations were reduced and the results tabulated in the office.

No other discharge observations have been made during the period covered by this report.

The reduction of the high-water discharge observations of 1909, in progress at the date of my last report, was completed and the results tabulated. These comprise observations on the Mississippi River at Columbus, Ky., Helena, Ark., Arkansas City, Ark., Vicksburg, Miss., Red River Landing, La., Carrollton, La.; on the Atchafalaya at Simmesport, on the Black River at Jonesville, and on the St. Francis River near its mouth.

Eleven velocity meters used in discharge observations were rated at the settling basins of the St. Louis waterworks at Bissels Point, January 21 to 27, 1910.

The scientific records, maps, and construction drawings of the Secretary's office have been catalogued as received and the card indexes kept up. Various requests for information and data of the Mississippi River have been complied with.

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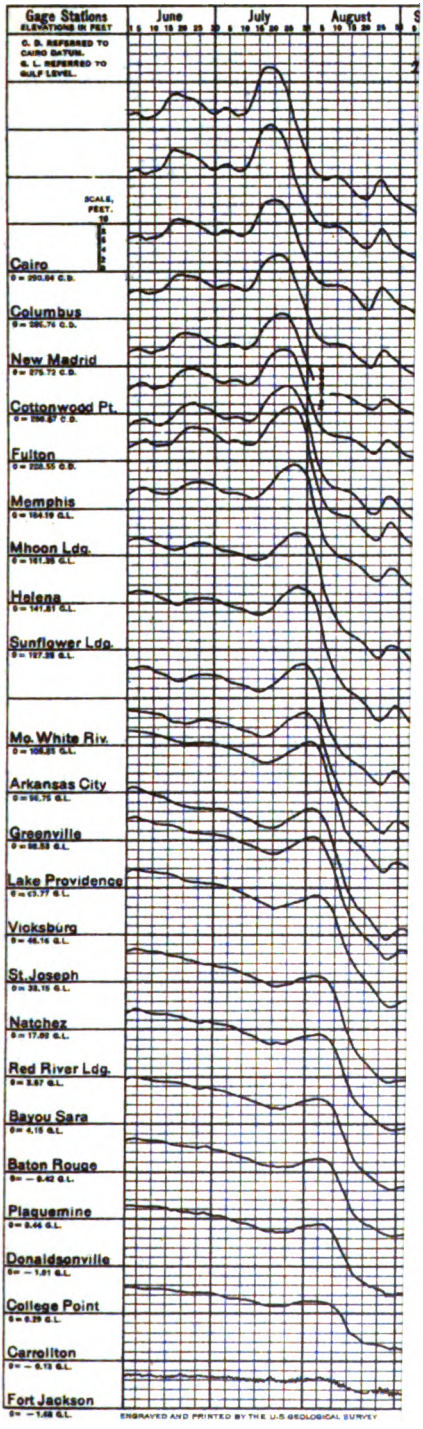

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The following assistants have been engaged in the office work of this division while not on field duty: Junior Engineers E. J. Thomas, G. H. Wolbrecht, and T. B. Perry; Surveyors F. E. Early, E. E. Whitehead, C. W. Schweizer, R. A. Brown, J. G. Frost, and W. W. Primm.

This division has remained under charge of Assistant Engineer Kivas Tully.

Plant.—The floating plant pertaining to surveys, gauges, and observations consists of the steamers *Gen'l T. L. Casey* and *Patrol*, the quarter boat *Illinois*, and a number of skiffs. The small tender *Mars*, belonging to the dredging outfit, has for several seasons been used for the survey work with the quarter boat *Illinois*. At the close of the last season, while towing the quarter boat and a fuel barge up to West Memphis, the boiler of the *Mars* became bagged when near Indian Point, about 178 miles below Memphis, and the *Patrol* was sent down to bring the outfit up to the fleet quarters. All this plant when not in the field has been cared for at the dredge depot at West Memphis, where the necessary repairs and renewals have been made, the expense being borne by this allotment.

The steamer *Patrol* was in service of dredges and dredging from September 20 to October 10, 1909.

An additional boat specially designed for discharge and gauge-inspection service is much needed.

DREDGES AND DREDGING.

Project.—On June 20, 1896, the Mississippi River Commission adopted a project for obtaining and maintaining, by means of dredges, a channel in the Mississippi River below Cairo, with a width of 250 feet and a depth of at least 9 feet throughout the year, except when the river is closed by ice. The Commission in 1891 took under consideration the question of construction of dredging devices to be operated with a view to obtaining temporary relief for low-water navigation and experimented along these lines between 1891 and 1896. Up to the present time 10 hydraulic dredging plants have been constructed, 9 of which are still serviceable. Detailed reports of work for each year will be found in the annual reports of the Mississippi River Commission, beginning with that of 1892.

PLANT.

The floating plant pertaining to dredges and dredging is as follows:

Dredges.—Beta, Gamma, Delta, Epsilon, Zeta, Iota, Kappa, Henry Flad, and *B. M. Harrod*	9
Steamboats.—Sachem, Choctaw, Leota, Nokomis, Wynoka, Search, Venus, Vulcan, Mercury, and *Mars*	10
Pile sinkers.—Nos. 13, 971, 981, 982, and *983*	5
Barges.—Nos. 041 and *051*	2
Pump boats	1
Calking flats	2
Sectional dock, sections	6

Also a number of skiffs.

The steamer *Patrol*, pertaining to surveys, gauges, and observations, was used for inspection and bar surveys below Memphis from September 20 to October 10, 1909.

The small tenders *Venus, Vulcan, Mercury,* and *Mars* were used at different times as fleet tenders, during the lay-up season.

The steamer *Mars* was in service under surveys, gauges, and observations from October 9, 1909, to February 5, 1910.

ALTERATIONS IN PLANT.

The dredge *Gamma* was selected for experimental work with a view to obtaining more efficient dredging apparatus. As a preliminary to this work a new 24-inch pump was installed to replace the old 34-inch pump, the necessary alterations being made in the suction and discharge pipes in the dredge, and new ponton pipe line was designed and purchased. An experimental suction head of the ordinary type, but involving a number of new features, was designed, let by contract, and will soon be delivered. Experimental changes in the old suction head of the *Gamma* are being made at the dredge fleet. Preliminary designs for an experimental drag suction head have been made. In connection with these designs, a disk excavator was constructed and tested at the dredge fleet.

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The completion of plans, previously authorized, for a dredge of larger capacity than any of the present dredges has been deferred until the completion of the experimental work with the dredge *Gamma*.

The use of anchors and a 3,000-foot steel wire cable was tested on the dredge *B. M. Harrod* by use in the field throughout the dredging season with satisfactory results. The anchors held well at all places where used, but further tests are necessary before decision can be made as to whether anchors will be superior to piles. No difficulty was experienced in handling the dredge with the long cables, and the advantages of longer cables on the larger dredges was so well shown that the dredge *Beta* is being similarly equipped with 3,000-foot cables.

NEW INSPECTION BOAT.

The preliminary plans for this boat, for which an allotment had previously been made, were prepared, but there being practically no data available on which to base calculations for the type of boat selected when running in shallow rivers, it was considered advisable to have a model tested in the experimental tank at Washington. The necessary drawings and controlling conditions were placed with the Navy Department, and the report of the trial tended to show that the economical speed limit would be 13 miles per hour with an expenditure of 500 indicated horsepower. At the suggestion of the department the model was lengthened to represent an addition of 30 feet to the length of the vessel, and a second series of trials was made, but the benefit in increased speed shown as a result of the change was not sufficient to warrant an increase in the original dimensions of the vessel. With a few minor modifications suggested by the report of the model trial, plans and specifications for the new boat have been prepared.

SUBSISTENCE.

All employees were furnished subsistence in kind. During the year 92,132 rations were served at a cost of $0.52974 each, including the wages of cooks, waiters, and all necessary labor in caring for quarters.

Railway dry dock.—This dock, which is being constructed on the government land at West Memphis, Ark., is a dry dock of the side-haul railway type, with a capacity of about 1,500 tons, or sufficient to haul out the heaviest vessel in charge of the Commission. A description of the dock will be found on page 2685 of Report of the Chief of Engineers for 1909. The work is being done under contract with the H. I. Crandall & Son Company, of East Boston, Mass. The work has been continued during the year as far as stage of the river and weather conditions has permitted and is now about 90 per cent complete. The work remaining to be done consists mainly of driving about 350 wooden piles, sinking and fastening wooden track to them, and putting hauling chains in place. This work can be done when the river falls to a stage of about 10 feet on the Memphis gauge.

COAL.

Forty barges of coal, containing 588,415 bushels, were purchased during the year. Twenty-six barges were delivered at the coal harbor above Caruthersville, Mo., and 14 at the United States dredge depot, at West Memphis, Ark. In addition to these barges 9,372 bushels were purchased in open market by boats en route.

The coal delivered at the coal harbor above Caruthersville was cared for at that place and delivered to dredges in that stretch of the river as required. At the close of the dredging operations the pump boat and all barges remaining at Caruthersville were moved to the dredge fleet by the steamer *Sachem*.

A four-hour test of the coal for the season's supply, delivered by the Monongahela River Consolidated Coal and Coke Company, was made and the coal found equal to the sample submitted.

Owing to the high stage of the river in July the steamers *Nokomis* and *Mars* were sent to the coal fleet above Caruthersville to remove drift which had accumulated at the head of the fleet to a dangerous extent. The *Mars* left the fleet on July 16 and the *Nokomis* on the 17th. The *Nokomis* returned to the dredge fleet on the 22d and the *Mars* on the 27th.

During the season two loaded coal barges were sunk while being towed by the steamer *Nokomis*, one about 2 miles above Caruthersville, Mo., and the other at Fritz Crossing. No blame attached to the towing crew, the loss being occasioned by bad condition of the barge in one case and excessive loading in the other, and the loss has been borne by the coal contractor.

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A contract has been entered into with the Monongahela River Consolidated Coal and Coke Company for furnishing 425,000 bushels of coal for use during the coming season.

REPAIRS TO PLANT.

The more important repairs made at the dredge fleet at West Memphis are stated in the following paragraphs. In addition, the usual work incident to the care of a large fleet has been done, the holds of the boats have been cleaned and painted; also all other parts requiring it have been painted and kept in good condition.

General minor repairs have been made, boilers scaled, machinery laid up on return from the field, and in the shops numerous tools have been made and repaired for use of the fleet.

An itemized statement of the cost of repairs will be found in Table 2, accompanying this report.

Dredge Beta.—Defective tubes renewed in boilers. Some concrete foundation girders placed under boilers; boilers and main steam line tested. New gear wheels for hauling ahead machinery obtained. Old drums from dredge *Harrod* fitted to hauling winches to accommodate new cables 3,000 feet in length; short sections of two discharge pipes in the hold were renewed. General repairs to furnaces, machinery, pipe lines, and cabin.

Dredge Gamma.—Boilers tested. New 24-inch pump installed. Suction head removed from suction pipe and experimental alterations made; dock constructed for installation of section of discharge pipe at stern of dredge; erection of new discharge pipe commenced. Rewiring of electric-light system begun. Various parts of boat and machinery repaired, and outside of hull above water line and parts of cabin painted.

Dredge Delta.—Boilers tested. Furnaces and defective tubes in boilers renewed; feed and jet pumps repaired; alterations made in suction pipe of jet pump. Minor repairs to main engines and other parts of machinery. One of old feed pumps removed and new plunger pump installed. New liners fitted in main pump. Brass sleeve of main pump shaft moved forward, to obtain new surface for journals. Caps made for ends of discharge pipe. Rewiring of boat and repairs to light engine completed. New switchboard installed.

Dredge Epsilon.—Boilers tested. Repairs to main pump engines, winding engines, spud hoist engines, pontons, and breeching. Liners and shrouds fitted in main pump and pump repaired. Discharge pipe in hold repaired. Electric lighting system rewired.

Dredge Zeta.—Boilers inspected and tested. Auxiliary steam line covered with magnesia insulation. Jet pump and cylinder heads of main pumping engine repaired. Additional stay bolts fitted in hot-water well. Pontons sand blasted and painted. Minor repairs to cabin.

Dredge Iota.—Boilers examined and tested. Iron foundation girders renewed under boilers. Main steam line, main engine, and propelling engine repaired. Shaft of one winding engine straightened. New throttle valve made. Exhaust pipes of propelling engines disconnected from heater and carried direct to stacks. New shrouds fitted on main pump runner and necessary adjustments to casing lining made. Discharge pipe, ponton connections, and searchlights repaired. Erection of steel nosing completed. Outside of cabin painted. Numerous minor repairs made to various parts of boat.

Dredge Kappa.—Boilers inspected and tested. Furnaces repaired. Minor repairs to main pumping engines and propelling engines. Parts of lining of main pump renewed. Discharge pipe in hold turned over to present new wearing surface and repaired. Wood under circular tracks on pontons renewed. Splash bulkheads erected to protect the iron structure and erection of new wheelhouses completed. Boat painted outside.

Dredge Henry Flad.—New links made for suction hoist engine. Crank-pin brasses of port pumping engine bored and fitted. Shrouds of main pump runner renewed and new liners fitted to casing. Discharge pipe in hold turned over to present new wearing surface and repaired. Wood under circular tracks on pontons renewed. Butt straps riveted to ponton discharge pipes to replace broken flanges and the connections of discharge pipes repaired. Machine shop shafting erected. Paddle wheels completed and erected. Splash bulkheads erected in wheelhouses. New spud installed. Cleaning and painting of hold and pile derricks completed. Umbrellas erected over stack casings. Exhaust pipe erected. Assembling of heating and refrigerating systems completed. Bells, bell wires, and steering gear shipped up. Work on the reconstruction of

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the upper works, destroyed by fire in January, 1908, was fully completed prior to the last field season.

Dredge B. M. Harrod.—Telltale to indicate to pilot the motion of paddle wheels was installed. Cooling tank erected. Suction pipes of jet pumps separated and independent pipe installed for starboard pump. Small wire cable substituted for sprocket chain in rigging for operating jet valves. New baffle plate constructed for discharge pipe. New winding drums installed to accommodate 3,000-foot cables.

Steamer Sachem.—Boiler deck, pilot house, roof, furnaces, stairways, whistle pipe, and nosing repaired. Injury sustained by forward guards and steel nosing by collision with a bridge above St. Louis repaired. Boilers inspected and tested. Main steam line, boiler feed pumps, and breeching repaired.

Steamer Choctaw.—Boilers, blow-off pipe, brine pump, and electric-light engine repaired. Cylinder of port propelling engine bored. Bitts renewed. Cast-steel nosing erected around the main deck to replace old wooden nosing. Minor repairs to other parts of the boat.

Steamer Leota.—Erection of steel nosing completed. Boilers inspected and tested. Wheel extensively repaired. Armature of dynamo rewound. New slide brasses fitted in crossheads of main engines. Other minor repairs made.

Steamer Nokomis.—Erection of steel nosing completed. Boilers tested. New crosshead made for electric-light engine. New crosshead brasses fitted in propelling engines. Numerous other minor repairs made.

Steamer Wynoka.—Boiler covering, propelling engine brasses and slides, wheel, brine pump, and brine tank repaired. Boilers tested. New steel nosing erected. Minor parts of boat and machinery repaired.

Steamer Search.—Sides of hull scaled above water line. Boilers tested. Furnace rebuilt. New stacks constructed and erected. New shaft installed in electric-light engine. Old rudders taken out and new ones built. New wheel built. Furnace and boiler covering repaired. Cabin painted. Parts of auxiliary steam line renewed. High and low pressure cylinders of main engine bored and new bull rings and packing rings made for pistons. Extensive repairs to guards, main deck, and hull. The machinery being assembled, following extensive repairs.

Steamer Venus.—Boiler inspected and tested. New breeching constructed. Large pump installed for fleet fire protection. Minor repairs made to other parts of boat and machinery.

Steamer Vulcan.—Doctor, boiler, breeching, and parts of machinery repaired. Boat painted. Other minor repairs were made. Fire pump installed.

Steamer Mercury.—Boiler tested. Breeching renewed. New stack erected. Pitmans and wheel repaired. Various other minor repairs made.

Steamer Mars.—New smokestack constructed and erected. Painting of boat completed. Deck and nosing repaired. Wheel repaired. Some new flues fitted in boiler. Bag in boiler set up. Repairs made to furnace, auxiliary steam line, together with other minor repairs to boat.

Pump boat.—Some repairs made to deck and roof.

Pile sinker No. 13.—Boiler inspected.

Pile sinker No. 971.—Docked and extensive repairs made to hull. Roof repaired and painted. Flame bed renewed and machinery prepared for service.

Pile sinker No. 981.—Boiler and jet pump repaired. Boiler inspected and tested. New smokestack constructed and erected. Derrick boom installed. Additional drum fitted to hoisting engine for use in handling derrick boom. Docked and extensive repairs made to hull. Boiler, roof, and machinery repaired.

Pile sinker No. 982.—Minor repairs to hull and boiler.

Pile sinker No. 983.—Some flues fitted in boiler. Leads, deck, and boiler and timber heads repaired. New suction well constructed for feed pump. New canvas laid on roof; cabin and other parts of boat repaired.

Sectional dock.—Some minor repairs made to trunk. Deck calked.

Barges Nos. 041 and 051.—Repaired and calked.

Motor boats.—Three skiffs were fitted with 6-horsepower gasoline engines.

Miscellaneous.—Some channel buoys were made for marking dredged and other channels.

Tools and appliances.—Shop tools dressed as required. A new Ingersoll-Sargent belt-driven air compressor and a traveler for handling boiler plates were installed in the boiler shop. Tools, bolts, and wrenches required for machine shop were made. Shop tools required in the blacksmith and boiler shops were made. An oil tank was made for storing pneumatic tools. Some new pinions were made for the power bending rolls. The planer and other machin-

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ery in woodworking shop were repaired. An experimental anchor was constructed.

Buildings and grounds.—The installation of the brass foundry was completed A blast pipe was made for the blacksmith shop. The water pipe from near the tank to the upper side of the reservation was renewed and location changed. A water line for fire protection was installed. The roofs of the record house, the S. G. and O. storehouse, dressed-lumber storehouse, and blacksmith shop were covered with rubberoid roofing. A shed was erected over the air compressor. A paint shop was constructed under quarter boat *No. 13*. An incline for handling coal and supplies was erected. A smokestack was erected over the forge in the blacksmith shop. The sides of the boiler house were covered with old sheet iron obtained from discarded pontons.

A gauge for water tank and a dump car for handling coal were constructed. Some gauge-cock boxes were made for the boilers. The warehouse was raised above high-water level. A hand crane for handling crucibles was constructed for the brass foundry. The boiler house was painted. Parts of the suction pipe from the artesian well were renewed, necessitated by a cave in the river bank.

DREDGING OPERATIONS ON THE MISSISSIPPI RIVER BETWEEN CAIRO, ILL., AND THE HEAD OF THE PASSES.

Full accounts of this work from 1896 to 1908 will be found in the annual reports of this office for those years.

During the low-water season of 1909 six dredges, the *Beta*, *Delta*, *Iota*, *Kappa*, *Henry Flad*, and *B. M. Harrod*, were operated at various crossings from Medleys, 31, to Montezuma, 312 miles below Cairo.

Three regular bar-survey parties were in the field during the season, and surveys were made of troublesome crossings as frequently as possible. These surveys serve to determine the areas of shoal water and aid in the selection of the channels to be dredged. Frequent inspections of the river were also made and all crossings sounded. Information was given to pilots and others engaged in navigating the river, and buoys and other marks showing location of the channel were placed where required.

The river reached only a moderate low-water stage, and no difficulty was experienced in maintaining a channel of the dimensions required by the adopted project—a depth of 9 feet and width of 250 feet—during the regular navigation season. Early in January, 1910, however, owing to ice gorges above Cairo, the river fell to a stage of 8.23 feet on the Cairo gauge, and depths of less than 9 feet developed at two crossings, Point Pleasant and Pecan Point. Dredges were in the field and were sent to these places, but before operations could be commenced, the movements of the dredges being interfered with by ice, the river began to rise rapidly and there was ample water at all places.

Plate 1, accompanying this report, shows the daily river stages during the season at all the gauge stations below Cairo.

The following are the lowest gauge readings during the past season at all stations from Cairo to Vicksburg; also the average low-water readings derived from the ten years 1892–1901. This average low water is used as a datum for reducing bar-survey soundings, made in connection with dredging operations:

Gauge.	Low water, 1909.		Mean low water 10 years, 1892–1901.	Difference.
	Date.	Reading.		
		Feet.	*Feet.*	*Feet.*
Cairo	October 15	6.94	4.0	2.94
Columbus	October 16–17	7.42	3.5	3.92
New Madrid	do	6.71	3.4	3.31
Cottonwood Point	October 17–18	2.15	0.5	1.65
Fulton	October 18–19	5.38	3.5	1.88
Memphis	October 18	5.44	0.9	4.54
Mhoon Landing	October 19	0.2	−4.0	4.2
Helena	October 19–20	5.70	1.8	3.90
Sunflower Landing	October 20–21	7.15	3.1	4.05
Mouth White River	October 19	9.62	6.0	3.62
Arkansas City	October 21–22	5.9	1.7	4.2
Greenville	October 22–23	3.54	1.9	1.64
Lake Providence	October 22–24	2.90	−0.5	3.40
Vicksburg	October 23–24	4.18	−0.8	4.98

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Following is a brief statement of the operations of each dredge while in the field, compiled mainly from the report of Assistant Engineer F. H. Hilliard, superintendent of dredging. The work and division of time of each dredge will be found in Table No. 5 accompanying this report.

Dredge Beta.—Left dredge fleet in tow of steamer *Nokomis*, September 9. Arrived at Point Pleasant September 18. The tow was delayed by swift current in bend of Island 35, which made it necessary to double trip for a distance of 41 miles. One of the boilers of steamer *Nokomis* became bagged and steamer *Sachem*, tender to dredge *Delta*, towed from Reelfoot to Point Pleasant. The steamer *Nokomis*, after being repaired, proceeded to Caruthersville for a barge of coal, arriving at Point Pleasant on September 20. Dredging commenced in Point Pleasant Crossing on September 20 and was continued to the 27th, when a channel had been completed. A second dredging commenced on October 11 and continued until the 13th, when a channel was completed.

The dredge and plant left Point Pleasant on October 14 and arrived at Medleys on the 15th. Dredging commenced on the 16th and continued to the 20th, when a channel had been completed.

The plant left Medleys Crossing on October 21 and arrived at head of Island No. 10 on same day.

The plant left Island No. 10 on October 24 and arrived at Point Pleasant on same date. Dredging began on November 4 and was completed on the 9th. Delays and other than usual ones incident to dredging were occasioned by breaking of cable and cable straps and bursting of rubber ponton sleeves.

The material dredged at Point Pleasant was stiff blue mud and at Medleys coarse sand and gravel. As is usual under similar conditions, progress at Point Pleasant was extremely slow, and although project channels were obtained the work of the dredge was inefficient. Considering the character of the material at Medleys, the work was satisfactory.

On November 9 it was found that the main winding drum gear wheels on the *Beta* were so badly damaged as to require replacing. As the dredge was not required in the field, she left Point Pleasant on November 12, arriving at the dredge fleet on November 14, when she was laid up.

Dredge Delta.—Left dredge fleet on August 10 in tow of steamer *Sachem*. Arrived at Fritz Landing on August 14, was moved to Linda Crossing on the 17th, and to Point Pleasant Crossing on the 22d. Dredging on this crossing commenced on August 22 and continued to September 13. The material was very stiff blue clay, and progress was very slow, but a good channel was obtained.

The dredge was moved to the bank at Reelfoot on September 13. Dredging on Island No. 14 Crossing was begun on October 1 and continued to the 12th, when a channel of 13 feet depth and of project width had been obtained. The material dredged was coarse gravel and sand. The dredge returned to the bank at Reelfoot on October 13.

The plant left Reelfoot on October 19 and arrived at Slough Landing Crossing on the 21st. This crossing was very narrow and flat and it was thought it would require dredging. A survey made on October 21 disclosed a new channel not requiring improvement, and the dredge was returned to Reelfoot, arriving at that place October 25.

The dredge left Reelfoot November 19 and arrived at West Memphis, Ark., on November 22.

Dredge Iota.—Left dredge fleet September 4; arrived at Pecan Point Crossing on the 6th. In preparing the dredge for service it was necessary to run the pump light to grind down the liners, as at some points they fitted too close to the pump runner. This grinding of the liners was completed on the 8th and dredging was commenced and continued to the 11th, when operations were suspended to clean and repair boilers. A bag in one of the boilers was set up and the heater repaired. Dredging was resumed on September 14 and completed on the 15th, with a 15-foot channel through the crossing. On October 9 redredging on Pecan Point Crossing was commenced and continued to the 12th, when a channel was completed. Material moved was sand and gravel.

The dredge was moved from Pecan Point November 12 to the dredge fleet to go into winter quarters.

Dredge Kappa.—Left dredge fleet August 10; arrived at Island No. 34 Crossing on the 12th. Dredging began on August 16 and was discontinued on the 24th on account of a slight rise in the river. Dredging to deepen and widen the lower part of the channel was commenced August 31 and completed September 2. Dredging of the upper part of the channel became necessary and

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was completed between September 8 and 11. The original dredged channel was extended through a ridge above the limits of the previous dredging between September 29 and October 3. Material in this crossing was sand and some small gravel and was easily moved.

The dredge was moved from Island No. 34 Crossing to Gold Dust Crossing on October 4. Dredging commenced on October 5 and continued to the 7th, when a 12-foot channel had been obtained. Material moved was sand.

The dredge was moved from Gold Dust Crossing to New Haven Crossing on October 8. Dredging began on October 8 and continued to the 11th, when a channel had been completed. The lower end of the dredged channel being narrow, it was widened between October 14 and 16, leaving a channel 12 feet deep and 500 feet wide. The material moved was sand and coarse gravel.

The dredge was moved from the bank near New Haven Crossing on October 25 to Osceola, Ark., for harbor; left Osceola December 26; arrived at Caruthersville, Mo., the 28th; left Caruthersville January 3; arrived at Point Pleasant Crossing on the 4th. Dredging began on January 5 and continued until noon on the 6th, when operations were suspended on account of floating ice in the river.

The dredge was moved to Ruddles Point on January 6, at which point she was held by heavy running ice until the 11th.

Left Ruddles Point January 11; arrived at dredge fleet on the 14th and went into winter quarters.

Dredge Henry Flad.—Left the dredge fleet October 24 for Nonconnah Crossing, and arrived there the same day. Dredging commenced on the 25th and continued to November 6, with occasional stops for cleaning discharge pipe, hot crank pin, repairing and priming pumps, repairing connection bolts on the pontons, clearing logs from the channel, and washing boilers. On account of the character of the material, which rendered the sinking of piles almost impossible and progress of excavation extremely slow, it was considered inadvisable to make further attempt to produce a channel at that point. There was at that time a channel of about the same depth down through Old River, to the right of Presidents Island, and it was determined to improve this channel and abandon work at Nonconnah. A slight rise in the stage, however, rendered further dredging unnecessary.

The *Flad* was moved to the dredge fleet on November 6, and remained there until December 10, when she was moved into the fleet and withdrawn from field service.

This dredge was again put in commission in place of the *Harrod*, the clogging of whose condenser prevented navigation with running ice in the river, and left the dredge fleet on January 2, arriving at Pecan Point Crossing on the 4th.

Dredging was commenced at 5.20 p. m. on the 4th and continued until 7.30 p. m. on the 5th, when the formation of ice in the river forced suspension of operations. The plant was moved to Deans Island and tied up until the 7th, when it was moved to the dredge fleet.

Dredge B. M. Harrod.—Left the dredge fleet August 20; arrived Pecan Point, Ark., the same day. Lay at this point until the 22d, when she departed for New Haven, Ark., arriving there the same day. She lay at this point, awaiting a lower stage, until September 1, when she departed for Linda, Mo., arriving on the 3d. Moved to Point Pleasant Crossing on the 9th to deepen the channel through the lower shoal. Work was commenced on this date and continued until the 13th, when a channel 14 feet in depth had been obtained. The material dredged was sand, with a small percentage of gravel. Delays in dredging were caused by grounding pontons and repairs to the baffle plate.

The use of anchors, with 3,000-foot cables, was tested in this work for the first time with most satisfactory results. The anchors held well and no difficulty was experienced in handling the dredge with the long cables.

On September 25 the dredge left Point Pleasant for the dredge fleet at West Memphis, Ark. She arrived at the dredge fleet on the 27th and was held at the fleet to be in readiness for work in the stretch of river below Memphis.

On October 14 she left the dredge fleet for Daisy Crossing and arrived there the same day. Dredging in this crossing was begun on the 15th and continued until the 19th when a channel had been obtained 13 feet in depth and 250 feet wide. The depth at the commencement of the work was 9 feet.

The plant left Daisy Crossing on October 20 and arrived at Montezuma Crossing on the 21st. Dredging began on the 22d and continued until October 24, when a channel 12 feet in depth and of project width had been obtained. The dredge was then moved to Helena, Ark., where she arrived the same day.

Left Helena on the 15th; arrived at the dredge fleet at West Memphis on the 16th and was tied up at the bank below the dredge fleet. While lying at the

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bank parts of the hold were cleaned and some minor repairs were made to the machinery.

This dredge remained at the dredge fleet awaiting a lower stage until December 29, when she departed for Pecan Point Crossing. On account of the ice entering the condenser well and clogging it so that the supply of circulating water was entirely cut off, the propelling engines were disabled just abreast of the wharf boat at Memphis, and the dredge drifted downstream until by an occasional use of the propelling wheels, she was worked part way across the river and lines run out to the sand bar. She remained tied up until January 1, 1910, when she was moved to the dredge fleet at West Memphis and laid up.

RESULTS OF DREDGING OPERATIONS DURING LOW-WATER SEASON OF 1909.

The following brief statement of the results of dredging during the past season is taken mainly from the report of Assistant Engineer F. H. Hilliard, superintendent of dredging. The name of each dredge working at a bar is stated for reference in case details of the work are desired.

Medleys.—Results of dredging in this crossing are very clearly shown by a comparison of maps of October 3 and October 27. Dredging was commenced by the *Beta* on October 16. On this date soundings from the inspection boat showed 9 feet in the channel which indicated considerable filling since the last survey had been made on October 3.

This channel depth was increased from 9 to 13 feet by four days' dredging. The material removed was heavy sand and gravel. The location of the dredging axis was correct and the work was eminently successful.

Point Pleasant.—The first survey of Point Pleasant Crossing discovered a very complicated situation. From the main body of the upper pool to the head of the lower pool was a distance of nearly three miles. The channel or channels, for there were three or four distinct routes, through this distance consisted of isolated holes in the bar connected by shallow, narrow, and crooked depressions.

Any one of these routes would have involved the dredging of two or more shoals. The one selected seemed to present the fewest difficulties to improvement and to offer the best promise of permanence.

On account of the character of the material encountered in the upper shoal, however, a satisfactory channel was only produced after great expenditure of time and labor.

The dredge *Delta* was placed in this crossing at the upper shoal on August 22 and continued operations with slight interruptions until September 13 when a narrow channel of good depth had been produced.

The *Beta* was placed in this crossing on September 20 to widen and otherwise improve the narrow channel made by the *Delta*, since on account of the form of her suction head it was thought she would be better able to handle the stiff blue clay encountered. The work was accomplished with extreme difficulty. While a channel of project dimensions was maintained throughout the low-water period, the work of the dredges was not satisfactory, as the dredges are not adapted to handling clay, and whenever this material has been encountered the results have proved unsatisfactory.

The channel excavated by the *Harrod* through the lower shoal, September 9 to 13, was maintained without further dredging.

The dredge *Kappa* was moved to Point Pleasant Crossing in January with great difficulty, owing to running ice in the river, but was able to accomplish very little owing to great increase in the volume and thickness of the ice after dredging had been begun.

On this account alone, for a short time in January there was only 8 feet through the lower shoal.

The dredges *Beta*, *Delta*, *Kappa*, and *Harrod* worked at this place.

Island No. 14.—The *Delta* made a satisfactory channel 2,500 feet long and of project width and depth, which was maintained through the season without further dredging. The *Delta* commenced work on October 1, and the channel was completed on the 12th. The work was successful in all respects.

Gold Dust.—Two days' dredging by the *Kappa* was required to open a channel through a ridge. A channel of project dimensions was maintained.

New Haven.—The channel at this point followed closely along the right bank and was obstructed by a reef which joined the shore about 500 yards below New Haven Landing.

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This was a troublesome shoal, but a very satisfactory channel was obtained by five days' dredging with the *Kappa*.

Island No. 34.—This crossing was especially troublesome because it was necessary to abandon the best natural channel and open a new channel through a reef on which there was only 6 feet of water at the time operations were commenced.

Dredging was required four separate times in maintaining the channel selected, viz, August 16 to 24, August 31 to September 2, September 8 to 11, and September 29 to October 3, making a total of eighteen days' dredging for this crossing. After October 3 no further dredging was required and the channel continued in excellent condition during the remainder of the low-water season. The dredge *Kappa* was operated at this place.

The location and execution of the work were eminently successful and furnish a striking example of successful channel deepening and maintenance. There was a depth of 13 feet through this channel throughout the season except for a very few days.

Pecan Point.—The peculiarity of this crossing, which rendered it troublesome, was the instability of the material of the river bottom. The surveys indicate a shifting of the sand for each fluctuation of the stage; this caused filling of the dredged channel and necessitated dredging a second and third time. A channel of project dimensions was maintained during the season except for a few days in January, when the running ice in the river prevented dredging.

The dredges *Iota* and *Flad* were operated at this place.

Nonconnah.—This shoal was formed by a gravel reef which joined the shore about one-half mile below the mouth of Nonconnah Creek. There was an alternative channel down to the right of Presidents Island, but this involved a crossing (Wyanoke) with two long shoals.

After carefully considering the two possibilities the Nonconnah shoal was determined upon for improvement. On account of the character of the material, however, the *Flad* could make but very little headway, and the location was abandoned in favor of Wyanoke. The operations of the *Flad* occurred October 24 to November 4.

A slight rise following the work of the *Flad* rendered further dredging unnecessary.

Daisy.—Very satisfactory work was accomplished in this crossing by the *Harrod*. The channel depth was increased from 9 to 13 feet in four and one-half days, October 15 to 19, and improved steadily during the remainder of the season.

Montezuma.—The work at Montezuma consisted in straightening and widening a crooked and narrow channel. This was successfully accomplished by the *Harrod* in one and one-half days, October 22 to 24.

No dredging was required below Montezuma, but the shoals at Indian Point and Catfish Towhead would have proved troublesome had the stage declined a little more.

A summary of the work of the dredges during the season is given in Table No. 5 accompanying this report.

Based upon the usual assumption that the width of each cut is the width of the suction head of dredge, and that the side slopes of the channel are 1 on 2½, the amount of the material moved by the dredges during the season of 1909 was 1,260,171 cubic yards.

The following are the quantities dredged for the last eleven years:

Dredging season.	Material dredged.	Dredging season.	Material dredged.
	Cubic yards.		*Cubic yards.*
1899	1,612,223	1905	197,847
1900	1,145,558	1906	297,300
1901	1,666,465	1907	1,151,739
1902	813,380	1908	2,167,766
1903	891,098	1909	1,260,171
1904	2,149,734		

A statement of the cost of dredging operations from May 1, 1909, to April 30, 1910, is given in Table No. 2, accompanying.

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SURVEYS.

The steamers *Venus*, *Vulcan*, *Mercury* (and the *Patrol* for a short time) were used for making surveys in connection with dredging operations. The steamer *Venus* party covered the stretch of river from Medleys (31) to Caruthersville, Mo. (110), 79 miles; the *Vulcan* from Gold Dust (158) to Wolf River (230), 72 miles, and the *Mercury* and *Patrol* from Memphis (230) to mouth of Red River (765), 535 miles. The numbers in parentheses are distances in miles below Cairo.

INSPECTION.

The steamers *Search*, *Sachem*, and *Patrol* were used as inspection boats by the superintendent of dredging in examining into the condition of the channels and directing the work of the dredges and steamboats. The office of the superintendent was maintained on the *Search* during the dredging season. Thirty-one trips of inspection were made during the season, the total of the distances covered amounting to 4,448 miles. The soundings obtained on these trips are given in Table No. 3, accompanying.

The following papers accompany this report:

Money statements.

Abstract of contracts in force.

Commercial statistics.

Statement of charts issued and sold.

Table 1. Highest and lowest gauge readings in 1909, Mississippi River and tributaries.

Table 2. Cost of dredging operations May 1, 1909, to April 30, 1910.

Table 3. Depths over shoal crossings, Mississippi River below Cairo, low water season of 1909.

Table 4. Dimensions of channels through bars, Mississippi River below Cairo, dredging season of 1909. Determined from surveys.

Table 5. Summary of dredging operations, Mississippi River below Cairo, during the low water season of 1909.

Table 6. Highest gauge readings, Mississippi River and tributaries, in 1910.

Plate 1. Hydrograph of Mississippi River, Cairo, Ill., to Fort Jackson, La., June 1, 1909, to May 31, 1910.

Appendix A. Laws affecting the Mississippi River Commission, July 1, 1909, to June 30, 1910.

Respectfully submitted.

C. H. KNIGHT,
First Lieutenant, Corps of Engineers,
Secretary Mississippi River Commission.

Col. WM. H. BIXBY,
Corps of Engineers, U. S. Army,
President Mississippi River Commission.

MONEY STATEMENT.

Appropriation for improving Mississippi River.

July 1, 1909, balance unexpended		[a] $613,868.60
Amounts transferred from allotments in charge of first and second districts' officer in payment of purchases of coal, credited to allotment for "Dredges and dredging," as follows:		
July, 1909	$4,256.90	
November, 1909	7,991.15	
February, 1910	4,818.81	

[a] The amount, $613,865.93, reported in Annual Report for 1909, has been increased $2.67 during the fiscal year by refundment of overpayment of that amount from allotment for "Dredges and dredging."

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Amount transferred from appropriation for examinations, surveys, and contingencies of rivers and harbors (survey of Ohio River) for tentage transferred to United States Engineer Office, Louisville, Ky., credited to allotment for "Surveys, gauges, and observations," November, 1909	$81.60	
Amounts received from sales of condemned engineer property, under the provisions of section 5 of river and harbor act of June 13, 1902, credited in December, 1909, to allotments for "Mississippi River Commission" ($1.50), and "Dredges and dredging" ($188.09)	189.59	
Amount allotted from appropriation by sundry civil act approved March 4, 1909, to "Mississippi River Commission" (allotment approved by Acting Secretary of War Apr. 28, 1910)	7,500.00	
Amounts allotted from appropriation by sundry civil act approved June 25, 1910 ("Mississippi River Commission," $35,000; "Surveys, gauges, and observations," $65,000; "Dredges and dredging," $380,000), allotments approved by Assistant Secretary of War April 30, 1910	480,000.00	
		$504,838.05
		1,118,706.65
June 30, 1910, amount expended during fiscal year		503,013.64
July 1, 1910, balance unexpended		615,693.01
July 1, 1910, outstanding liabilities	18,252.30	
July 1, 1910, amount covered by uncompleted contracts	77,010.30	
		95,262.60
July 1, 1910, balance available		520,430.41

Appropriation for gauging waters of the Mississippi River and its tributaries.[a]

July 1, 1909, balance unexpended		[b] $1,883.92
Amount allotted by Chief of Engineers, July 13, 1909, from permanent annual appropriation made by section 6 of river and harbor act of August 11, 1888, as amended by section 9 of river and harbor act of June 13, 1902		9,100.00
		10,983.92
June 30, 1910, amount expended during fiscal year	$8,735.60	
June 30, 1910, amount reverted to Treasury during fiscal year	263.37	
		8,998.97
July 1, 1910, balance unexpended		1,984.95
July 1, 1910, outstanding liabilities		1,476.89
July 1, 1910, balance available		508.06
Amount that can be profitably expended in fiscal year ending June 30, 1912, in addition to the balance unexpended July 1, 1910		9,100.00

[a] The custody and care of the gauges maintained under this appropriation were assumed by the Mississippi River Commission February 11, 1901, on which date they were transferred to the secretary, under authority of Secretary of War, dated January 25, 1901.

[b] The amount, $1,880.67, reported in Annual Report for 1909, has been increased $3.25, paid by Treasury settlement No. 9268, September 14, 1909, from unexpended balance of allotment for 1908, previously reported as reverted to Treasury.

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Itemized statement of expenditures during the fiscal year ending June 30, 1910, submitted in compliance with requirement of section 6 of river and harbor act of August 11, 1888.

Observations:		
Pay of permanent gauge observers		$3,600.00
Inspections and repairs:		
Inspection of gauges on Mississippi River by junior engineers and parties on steamers	$1,647.75	
Inspection of gauges on tributaries	275.89	
Renewals and repairs of gauges and bulletins	749.52	
		2,673.16
Office expenses and contingencies:		
Pay of assistant and junior engineers, recorders, and clerks	2,042.91	
Stationery, printing, office rent, etc	419.53	
		2,462.44
		8,735.60

CONSOLIDATED STATEMENT OF APPROPRIATIONS EXPENDED UNDER THE SECRETARY, MISSISSIPPI RIVER COMMISSION, TO JUNE 30, 1910.

Appropriation for gauging waters of the Mississippi River and its tributaries.

Allotments from general appropriations for examinations, surveys, and contingencies of rivers and harbors by acts of—	
March 3, 1871 (allotment Apr. 11, 1871)	$5,000.00
June 10, 1872 (allotment July 11, 1872)	5,000.00
March 3, 1873 (allotment May 17, 1873)	5,000.00
June 23, 1874 (allotment July 29, 1874)	5,000.00
March 3, 1875 (allotment Mar. 22, 1875)	5,000.00
Specific appropriations by river and harbor acts of—	
August 14, 1876	5,000.00
June 18, 1878	5,000.00
March 3, 1879	5,000.00
June 14, 1880	5,000.00
March 3, 1881	5,000.00
August 2, 1882	5,000.00
Deficiency act of March 12, 1884	2,100.00
Specific appropriations by river and harbor acts of—	
July 5, 1884	5,000.00
August 5, 1886	5,000.00
Allotted from specific appropriation by river and harbor act of August 11, 1888 (allotment Oct. 17, 1888)	8,700.00
Deficiency act of October 19, 1888	3,600.00
Allotments from permanent indefinite appropriation made by section 6 of river and harbor act of August 11, 1888, for fiscal years, viz:	
1890 (allotment Aug. 23, 1889)	9,000.00
1891 (allotment Aug. 19, 1890, $8,700, less $3,518.34 withheld in United States Treasury under ruling that only $6,000 can be expended each fiscal year)	5,181.66
1892 (allotment July 17, 1891)	5,100.00
1893 (allotment July 15, 1892)	5,500.00
1894 (allotment July 18, 1893)	5,500.00
1895 (allotment June 5, 1894)	5,500.00
1896 (allotment June 4, 1895)	5,500.00
1897 (allotment May 13, 1896)	5,500.00
1898 (allotment June 16, 1897)	5,500.00
1899 (allotments May 27, 1898, $5,500; July 12, 1898, $500)	6,000.00
1900 (allotment June 1, 1899)	5,500.00
1901 (allotment July 2, 1900)	6,000.00
1902 (allotment July 31, 1901)	6,000.00

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Allotments from permanent annual appropriation made by section 6 of river and harbor act of August 11, 1888, as amended by section 9 of river and harbor act of June 13, 1902, for fiscal years, viz:	
1903 (allotment July 23, 1902, $9,600, less $500 allotted Aug. 2, 1902, to St. Paul (Minn.) district)	$9,100.00
1904 (allotment Apr. 18, 1903)	9,100.00
1905 (allotment Aug. 11, 1904)	9,100.00
1906 (allotment June 30, 1905)	9,100.00
1907 (allotment July 2, 1906)	9,100.00
1908 (allotment July 24, 1907)	9,100.00
1909 (allotment July 8, 1908)	9,100.00
1910 (allotment July 13, 1909)	9,100.00
Total	227,981.66

EXPENDED.

	To June 30, 1909.	During year ending June 30, 1910.	Total.
Expenditures	$203,894.16	$8,735.60	$212,629.76
Unexpended balances reverted to Treasury	[a] 13,103.58	263.37	13,366.95
Total	216,997.74	8,998.97	225,996.71
Unexpended balance June 30, 1910			1,984.95
Total appropriated, etc			227,981.66

[a] The amount, $13,106.83, reported in Annual Report for 1909 has been reduced $3.25, paid by Treasury settlement No. 9268, September 14, 1909, from unexpended balance of allotment for 1908, previously reported as reverted to Treasury.

Appropriation for waterway from Lockport, Ill., to St. Louis, Mo.

Act of June 13, 1902 (river and harbor)		$25,000.00
Amount transferred from allotment for "Survey of Illinois and Des Plaines rivers, Ill.," as reimbusement		1,093.40
Total		26,093.40
Expended to June 30, 1906	$22,291.23	
Unexpended balance carried to surplus fund on June 30, 1909, under the provisions of section 10 of sundry civil act of March 4, 1909	3,802.17	
		26,093.40

Abstract of contracts in force June 30, 1910—Improving Mississippi River, Mississippi River Commission, secretary's office.

Contractor.	Amount and character of work.	Price.	Date of contract.	Date of approval.	Date of beginning work.	Date of expiration.
H. I. Crandall & Son Co.	Construction of side haul railway dry dock.	$100,220.00	1909. Apr. 23	1909. June 10	1909. June 14	Feb. 7, 1910 [a]
Acme Boiler and Construction Co.	Steel pontons	4,500.00	Oct. 16	[b]	Oct. 19	Mar. 11, 1910 [a]
The Monongahela River Consolidated Coal and Coke Co.	425,000 bushels coal, per bushel.	.12	1910. Mar. 28	1910. Apr. 18	1910. Apr. 18	June 30, 1911
The Springfield Boiler and Manufacturing Co.	Steel plate suction head.	1,500.00	Mar. 30	[b]	Mar. 31	July 2, 1910
Nina Realty Co	Lease of offices and storage rooms, per annum.	6,724.00	June 1	[b]	July 1	June 30, 1911
C. H. Organ	Water-front privileges, per annum.	250.00	June 16	[b]	July 1	June 30, 1911

[a] Time limit waived. [b] Emergency contract.

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COMMERCIAL STATISTICS FOR CALENDAR YEAR 1909.

TABLE No. 1.—*Receipts and shipments.*

Tonnage between—	Number of passengers.	Grain and its products.	Cotton.	Cotton seed and its products.	Live stock.	Coal and coke.	Lumber.
		Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
St. Louis and Cairo	37,861	21,325	3,129	614	15,184	164,496	19,925
Cairo and Memphis	50,519	11,340	12,489	9,567	3,942	737,761	70,848
Memphis and Vicksburg	104,909	17,325	20,563	23,287	10,792	632,570	78,116
Vicksburg and New Orleans	80,240	34,794	10,599	17,103	2,105	607,383	31,501

Tonnage between—	Logs.	Iron, steel, and metals.	Groceries and provisions.	Stone, gravel, and sand.	Oil.	Unclassified and miscellaneous.	Total.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
St. Louis and Cairo	56,040	4,999	11,247	.....	478	19,147	318,584
Cairo and Memphis	305,716	34,835	13,160	16,830	2	15,603	1,232,093
Memphis and Vicksburg	223,434	10,949	25,971	541	2,746	24,743	1,071,037
Vicksburg and New Orleans	242,574	10,264	60,659	770,941	233,191	83,606	2,104,720

NOTE.—Each stretch is treated as a separate river, and tonnage carried between ports on different stretches will appear in the statistics of all intervening stretches: consequently the sum of the tonnage carried in the four stretches does not represent the total traffic on the river as a whole.

TABLE No. 2.—*Receipts and shipments at principal ports.*

Port.	Passengers carried in and out of port.	Grain and its products.	Cotton.	Cotton seed and its products.	Live stock.	Coal and coke.	Lumber.
		Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
St. Louis, Mo.	[a] 497,181	17,174	3,129	614	17,423	163,496	18,827
Memphis, Tenn.	84,726	16,725	25,363	13,877	8,793	163,779	17,567
Vicksburg, Miss.[b]	27,419	2,015	1,705	4,147	429	23,173	2,817
New Orleans, La.[c]	47,055	396,495	461,018	142,075	2,438	535,036	880,737

Port.	Logs.	Iron, steel, and metals.	Groceries and provisions.	Stone, gravel, and sand.	Oil.	Unclassified and miscellaneous.	Total.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
St. Louis, Mo.	30,300	4,911	25,021	.....	478	61,682	352,055
Memphis, Tenn.	75,000	24,473	19,983	425	2,226	23,196	391,407
Vicksburg, Miss.[b]	18,000	15	7,312	14	59	5,664	65,350
New Orleans, La.[c]	160,056	68,344	1,089,605	382	531,966	519,464	4,787,618

[a] Includes 420,780 passengers in local excursion traffic.
[b] The traffic with the Yazoo River and its tributaries not included.
[c] Includes exports and imports and the domestic coastwise traffic as far as reported.

TABLE No. 3.—*Seagoing traffic at New Orleans, La.*

Arrivals and departures.	Number.	Tonnage.
Foreign-bound vessels	2,082	4,191,140
Coastwise vessels	630	1,663,648
Total	2,712	5,854,788

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RECEIPTS AND SHIPMENTS.

	Tons.
Grain and its products	363,837
Cotton	452,110
Cotton seed and its products	130,503
Live stock	1,720
Coal and coke	5,304
Lumber	862,195
Logs	27,791
Iron, steel, and metals	58,509
Groceries and provisions	1,028,740
Oils	371,194
Miscellaneous and unclassified	474,351
Total	3,776,254

TABLE No. 4.—*Ferry traffic.—Freight carried.*

Location of ferries and transfers.	Number of passengers.	Grain and its products.	Cotton.	Cotton seed and its products.	Live stock.	Coal and coke.	Lumber.
		Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
At St. Louis, Mo	1,706,661	710,551	10,090	689	54,622	2,285,110	542,948
At Chester, Ill.; Moro, Ill.; Grand Tower, Ill.; Cape Girardeau, Mo.; Commerce, Mo.	46,584	9,229	.....	.....	1,349	147,841	310
At Cairo, Ill., to Birds Point, Mo., Greenfield, Mo., and Wickliffe, Ky.; at Belmont, Mo., to Columbus, Ky.; at Cottonwood Point, Mo	90,658	19,828	194	124	1,360	1,140	10,847
At Memphis, Tenn., to Hopefield and Mound City, Ark	170,993	85,470	18,913	5,835	9,430	44,256	68,075
At Helena, Ark.; Arkansas City, Ark., and Ashport, Tenn	98,000	7,520	6,297	3,010	748	32,464	24,747
At Vicksburg, Miss., to Delta Point, La	100,398	6,284	74	529	364	83,318	7,937
At Natchez, Miss.; Angola, La.; Bayou Sara, La.; Baton Rouge, La., and Donaldsonville, La	362,562	68,873	51,477	2,536	1,897	18,357	73,044
At New Orleans, La	4,259,580	199,661	94,390	68,005	33,959	112,767	467,674

Location of ferries and transfers.	Logs.	Iron, steel, and metals.	Groceries and provisions.	Oil.	Stone, gravel, and sand.	Unclassified and miscellaneous.	Total.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
At St. Louis, Mo	17,779	287,739	194,567	75,981	874,032	1,989,441	7,043,549
At Chester, Ill.; Moro, Ill.; Grand Tower, Ill.; Cape Girardeau, Mo.; Commerce, Mo.	.....	44,691	55	.....	138,342	41,036	382,854
At Cairo, Ill., to Birds Point, Mo., Greenfield, Mo., and Wickliffe, Ky.; at Belmont, Mo., to Columbus, Ky.; at Cottonwood Point, Mo	780	2,730	7,961	142	7,630	50,016	102,682
At Memphis, Tenn., to Hopefield and Mound City, Ark	25,218	13,120	62,385	18,506	440,173	180,174	971,555
At Helena, Ark.; Arkansas City, Ark., and Ashport, Tenn	6,784	1,979	16,192	720	736	11,136	112,333
At Vicksburg, Miss., to Delta Point, La	.....	29,794	717	1,893	338	401,254	532,502
At Natchez, Miss.; Angola, La.; Bayou Sara, La.; Baton Rouge, La., and Donaldsonville, La	10,788	14,155	45,702	12,011	30,157	91,635	420,362
At New Orleans, La	9,302	137,568	510,016	48,968	65,408	1,523,320	3,266,038

Transfer of empty cars not included in tonnage at railroad transfer points.

Owing to deficiency and inaccessibility of the records of some transportation companies considerable tonnage which should appear under classified heads above had to be included in "Miscellaneous and unclassified."

The Missouri Pacific Railway transfer between Cairo, Ill., and Birds Point, Mo., was not operated during 1909.

On August 2, 1909, a transfer service was inaugurated at Baton Rouge, La., by the New Orleans, Texas and Mexico Railroad Company (Frisco Lines), connecting with the Louisiana Railway and Navigation Company. It is stated that two new steel hull transfer boats are under construction for service at this point.

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The revival of interest in river transportation, both on account of its natural advantages of cheapness and convenience and because of the pressing necessity for relief from the congested condition of railroad transportation at certain seasons, is gaining in strength steadily in the Mississippi Valley and will, it is confidently expected, lead to a solution of the present difficulties and conditions which have operated to its nearly total disuse. The rapidly increasing totals of production, both in agriculture, mines, and manufacturing, necessitate the provision of adequate and cheap methods of distribution. This condition would appear to presage an end to the disastrous competition between rail and river, which has resulted in the decadence of the latter and has proven but a temporary advantage to the former. The proper and natural solution seems to be along the line of mutual assistance—the railroads bringing to river points for distribution the products which they can not handle economically, and reserving and utilizing their equipment for a higher class freight, of which the supply is, or soon will be, adequate to test their full capacity.

The successful utilization of the river for transportation depends not only upon the depth of water that may be secured, but also very largely upon its equipment with the very best facilities, in the way of vessels of improved construction and terminals, which mechanical and executive energies may evolve from the experience of the past, together with a clear realization and anticipation of the needs of the future. That such a revolution is impending seems to be foreshadowed by the recent organization of such corporations as the Kansas City-Missouri River Navigation Company and the Mississippi Valley Transportation Company. The former has in view the restoration and building up to even greater proportions the large business formerly existing on the Missouri River between St. Louis and Kansas City, and the latter appears to be of very much wider scope, embracing the Mississippi River from St. Paul, Minn., to New Orleans, La., and all its navigable tributaries.

The experiment is being made of altering the steamer *Chester* of the Missouri River Line, a steel-hull, stern-wheel boat, to the propeller type; this method of propulsion in connection with light-draft river boats, which is said to have been successfully employed on South American rivers, is expected by its promoters to give greater speed and better control than the old type of side-wheel and stern-wheel boats.

The Mississippi Valley Transportation Company, under the experienced lead of Mr. W. K. Kavanaugh, has devised a type of steamboat and barge construction having a rectangular steel hull with flat bow and stern rakes, which is claimed to be peculiarly adapted to river traffic. The tests and experiments with the model of this type are said to have proven most satisfactory. The company reports that one of these boats will be in operation by May, 1911, and that further construction work will be pushed, as there has been already pledged to them more than sufficient tonnage to utilize their equipment at its full capacity as fast as construction work can be completed.

That those interested in inland water transportation are at last awakening to the necessity of providing more modern facilities for the handling of freight is evidenced by the construction by the board of commissioners of the port at New Orleans of magnificent and spacious docks and wharves with their steel sheds, loading cranes, moving platforms, railroad trackage, etc.

At Memphis, Tenn., the Illinois Central Railroad Company has recently placed in operation at a point about 3 miles below the steamboat landing and adjacent to their freight yards a telpherage system for the rapid and economical handling of cargoes from and to boats and barges in the river. The construction at the river end consists of a steel tower carrying a cantilever steel span of 60 feet. The runway is over a timber platform 32 by 300 feet, which gives ample space for the deposit and handling of the cargoes in transfer from boats to cars, and vice versa. On the runway is suspended a pair of standard 5-ton Sprague electric hoists, each equipped with a 25-horsepower electric hoist and 10-horsepower motor. This telpherage machine is intended to handle cotton, logs, timber, steel rails, and general merchandise. Additional runways are to be constructed as they may be needed, to which the various classes of commodities may be switched for convenience in loading. The plans for these terminals at Memphis were conceived by Mr. A. S. Baldwin, chief engineer of the Illinois Central Railroad Company, and were executed under his general supervision.

During this year the Lee Line, United States mail steamers, one of the principal packet lines operating south of St. Louis, Mo., has extended its service from

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Friars Point, Miss., its previous southern terminus, to Vicksburg, Miss., where connection may be made with steamers for all points on the lower Mississippi River and its tributaries, thus closing the connecting link of the broken chain of packet service between St. Louis and New Orleans and making possible an all-water route for freight and passengers from St. Paul, Minn., to New Orleans, La.

TON MILEAGE.

The reports required of vessel owners by federal enactments are already a cause of some complaint by them, and in order to secure the information called for by the act of June 25, 1910, the scope of these reports must be enlarged. The lack of systematic records by boat owners has been found a pronounced and emphatic difficulty in arriving at exact results in collecting commercial statistics for the Mississippi River. The necessity for more exact knowledge of conditions is manifest enough, but the benefits therefrom appear too remote to boat owners to induce them, in general, to undertake the keeping of more elaborate records, and in many cases they keep no commercial records of any kind.

The following figures, representing the ton mileage of the four separate stretches indicated, and the total for the river from St. Louis, Mo., to New Orleans, La., are an approximation made from the data at hand. The results are believed, however, to present a very fair and conservative statement, and reasonably close to the actual figures:

Stretches:	Ton miles.
St. Louis to Cairo	52, 282, 440
Cairo to Memphis	225. 694, 055
Memphis to Vicksburg	290. 703, 866
Vicksburg to New Orleans	310, 421, 979
Total for river from St. Louis to New Orleans	879, 102. 340

The figures submitted are based upon midstream distances—channel distances will average 10 to 15 per cent more. Railroad transfers and ferry traffic, and tonnage transported below New Orleans, La., are not included.

Statement of maps and charts issued and sold from July 1, 1909, to June 30, 1910—Improving Mississippi River, Mississippi River Commission, secretary's office.

Description.	Free issue.	Sold.	Total.
Upper alluvial valley map	198	74	272
Lower alluvial valley map	573	301	874
Inch-to-mile map	1,533	1,325	2,858
Detail chart, 1:20000 scale	1,557	444	2,001
Detail chart, 1:10000 scale	369	69	438
Detail chart, 1:10000 scale (harbor of New Orleans)	8	16	24
District map of lower Mississippi River	10	1	11
Lake Itasca Basin	4	16	20
St. Francis Basin	12	14	26
Total	4,264	2,260	6,524

Proceeds deposited with the assistant treasurer of the United States at St. Louis, Mo., $309.47.

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TABLE No. 1.—*Highest and lowest gauge readings of 1909.*

MISSISSIPPI RIVER.

Station.	Distance from Cairo.	Elevation of gauge zero above—		Highest.					Lowest.				
				Prior to 1909.		1909.		Difference compared with previous highest.	Prior to 1909.		1909.		Difference compared with previous lowest.
		Cairo datum plane.	Mean Gulf level.	Date.	Gauge reading.	Date.	Gauge reading.		Date.	Gauge reading.	Date.	Gauge reading.	
	Miles. Above.	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Aitkin, Minn.	1,090.0	1,206.78	.....	July 6–8, 1905	16.36	Aug. 15, 16	10.00	— 6.36	July 29, 1902	1.3	July 8	1.50	+ 0.20
St. Paul, Minn.	874.0	704.57	.....	Apr. 29, 1881	19.7	Apr. 4, 5	13.0	— 6.7	Mar. 19, 20, 22, 1896	— 0.9	Nov. 1	2.8	+ 3.7
Hastings, Minn.	849.0	690.79	.....	Apr. 30, 1881	18.00	Apr. 6, 7	12.2	— 5.80	Nov. 23, 1892	— 0.70	Feb. 13–18	2.5	+ 3.20
Winona, Minn.	760.0	660.34	.....	June 18, 1880	16.87	Apr. 12–14	10.0	— 6.87	Dec. 30, 1889	— 1.33	Jan. 7	2.4	+ 3.73
Prairie du Chien, Wis.	668.0	625.59	.....	June 22, 1880	21.30	Apr. 19	11.3	—10.00	1864	— 0.2	Oct. 19–22	2.8	+ 3.0
Rock Island, Ill.	510.7	562.37	.....	June 27, 1892	19.4	Dec. 25	13.70	— 5.70	Jan. 5, 6, 1890	— 0.9	Jan. 3–5	1.90	+ 2.80
Burlington, Iowa	427.6	531.25	.....	May 18, 19, 1888; June 30, 1892.	17.6	May 5, 6	11.70	— 5.90	Dec. 4, 5, 1895	— 1.1	Jan. 7	0.50	+ 1.60
Nashville, Iowa	393.6	516.86	.....	May 17, 18, 1888	12.0	May 5–7	7.50	— 4.50	Jan. 7, 1890	— 0.5	Jan. 3, 8, 9	0.60	+ 1.10
Hannibal, Mo.	329.4	469.60	.....	June 8, 1903	22.5	July 10	16.5	— 6.0	Jan. 9, 1890	— 1.75	Jan. 10	— 0.3	+ 1.45
Grafton, Ill.	233.0	424.09	.....	June 11, 1903	28.7	July 15	22.6	— 6.1	Dec. 9, 1895	— 0.9	Jan. 13	0.07	+ 0.97
Alton, Ill.	216.2	333.974	.....	June 9, 1903	115.80	do	111.70	— 4.10	Dec. 19, 1897; Jan. 28, 29, 1902.	82.70	do	83.60	+ 0.90
St. Louis, Mo.	190.8	400.22	.....	June 10, 1903	[a] 38.00	July 16	35.25	— 2.75	Jan. 2, 1900	— 2.52	Jan. 12	— 1.6	+ 0.92
Chester, Ill.	115.5	361.30	.....	June 13, 14, 1903	33.3	July 17, 18	31.0	— 2.3	Jan. 3, 1900	— 4.1	Jan. 15	— 0.5	+ 3.6
Grand Tower, Ill.	85.0	342.17	.....	June 14, 1903	33.80	July 18	32.1	— 1.70	Jan. 3–4, 1900	2.0	do	3.4	+ 1.4
Cape Girardeau, Mo.	54.5	324.97	.....	do	36.53	do	35.0	— 1.53	Feb. 1, 1902	0.8	do	0.6	— 0.2
Grays Point, Mo.	48.0	321.28	.....	June 14, 15, 1903	35.40	July 19	33.95	— 1.45	Dec. 31, 1890	0.95	do	0.2	— 0.75
Cairo, Ill.	0	290.84	.....	Feb. 27, 1883	52.17	Mar. 16, 17	47.27	— 4.90	Dec. 24, 1871	— 1.00	Oct. 15	6.94	+ 7.94
	Below.												
Columbus, Ky.	21.6	286.76	.....	Feb. 26, 1883	45.58	Mar. 17	43.70	— 1.88	Nov. 6–8, 1895	0.05	Oct. 16, 17	7.42	+ 7.37
Morrisson Landing, Mo. [b]	69.0	275.80	.....	Feb. 24, 1884	41.50	.....	.....	.....	Nov. 11–14, 1879	— 0.17	.....	.....	.....
New Madrid, Mo.	70.3	[c]275.72	.....	Mar. 29, 1897	40.27	Mar. 18	38.55	— 1.72	Nov. 6–8, 1895	0.55	Oct. 16, 17	6.71	+ 6.16
Cottonwood Point., Mo.	122.5	[d]250.67	.....	Mar. 19, 1903	39.96	Mar. 19, 20	36.80	— 3.16	Nov. 5–8, 1895	— 3.35	Oct. 17, 18	2.15	+ 5.50
Fulton, Tenn.	175.4	228.55	.....	Mar. 19, 1903	40.15	Mar. 21, 22	35.50	— 4.65	Nov. 7, 8, 1895	0.16	Oct. 18, 19	5.38	+ 5.22
Memphis, Tenn.	230.0	.....	184.19	Feb. 3, 1907	40.30	Mar. 22	38.60	— 1.70	Nov. 6–9, 1895	— 2.65	Oct. 18	5.44	+ 8.09
Mhoon Landing, Miss.	276.3	.....	161.35	Feb. 4, 5, 1907	42.20	Mar. 22–24	40.0	— 2.20	Nov. 6–11, 1895	— 7.80	Oct. 19	0.2	+ 8.00
Helena, Ark.	306.5	.....	141.81	Apr. 4, 1897	51.75	Mar. 24, 25	47.65	— 4.10	Nov. 8, 9, 1895	— 3.00	Oct. 19, 20	5.70	+ 8.70
Sunflower Landing, Miss.	352.7	.....	127.25	Mar. 27, 28, 1903	48.00	Mar. 25	45.10	— 2.90	Nov. 12–14, 1895	— 1.50	Oct. 20, 21	7.15	+ 8.65
Mouth White River, Ark.	393.2	.....	108.86	Mar. 28, 29, 1903	53.70	Mar. 28, 29	49.95	— 3.75	Dec. 28, 1872	0.00	Oct. 19	9.62	+ 9.62
Arkansas City, Ark.	438.3	.....	96.75	Mar. 27, 28, 1903	52.9	Mar. 28–30	50.1	— 2.8	Nov. 9, 10, 1895	— 3.6	Oct. 21, 22	5.9	+ 9.5

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Greenville, Miss	478.3	.....	33.53	Mar. 27, 1903	49.1	Mar. 29, 30	44.30	−4.30	Nov. 10, 11, 1895	−2.55	Oct. 22, 23	3.54	+ 6.09
Lake Providence, La	542.3	.....	69.77	do	46.48	Mar. 30, 31	44.30	−2.18	Nov. 17, 1895	−5.30	Oct. 22–24	2.90	+ 8.20
Vicksburg, Miss	599.3	.....	46.16	Apr. 16, 1897	52.48	Apr. 1, 2	48.00	−4.48	Nov. 13, 14, 1895	−6.5	Oct. 23, 24	4.18	+10.66
St. Joseph, La	648.3	.....	33.15	Mar. 28, 1903	48.07	Apr. 2	45.15	−2.92	Nov. 13, 1895	−9.3	Oct. 24	−0.95	+ 8.35
Natchez, Miss	700.3	.....	17.09	Mar. 28–30; Apr. 2, 1903.	50.35	Apr. 2–4	47.91	−2.44	Nov. 13–15, 1895	−0.85	Oct. 24–26	6.7	+ 7.55
Red River Landing, La	765.3	.....	3.57	May 14, 15, 1897	50.20	Apr. 4, 5	46.04	−4.16	Nov. 14, 1895	−0.60	Oct. 26	5.35	+ 5.95
Bayou Sara, La	799.8	.....	4.15	May 13–15, 1897	43.7	Apr. 3–7	39.11	−4.59	Nov. 16, 1895	−2.8	Oct. 26, 27	0.8	+ 3.6
Baton Rouge, La	833.3	.....	−0.42	do	40.65	Apr. 7, 8	36.17	−4.48	Nov. 14, 1894	0.45	do	3.50	+ 3.05
Plaquemine, La	854.1	.....	0.44	May 13–17, 1897	36.25	Apr. 7	31.95	−4.30	do	−0.94	Oct. 27	1.95	+ 2.89
Donaldsonville, La	885.4	.....	−1.01	May 13, 1897	32.75	do	28.65	−4.10	Nov. 11, 1894	1.00	Oct. 17	2.05	+ 1.05
College Point, La	904.5	.....	0.29	May 15, 1897	27.95	Apr. 8	24.40	−3.55	Nov. 14, 1894	−0.91	Oct. 15, 17, 27, 30.	1.20	+ 2.11
Carrollton, La	957.0	.....	−0.13	Mar. 29, 1903; Apr. 5, 6, 1903.	19.42	Apr. 6–8	16.55	−2.87	Dec. 27, 1872	−1.60	Nov. 4	1.00	+ 2.60
Algiers, La	966.0	.....	−2.64	Mar. 25, 26, 29, 1903	19.9	Apr. 6	17.45	−2.45	Dec. 20, 28, 1904	2.0	Oct. 21	3.25	+ 1.25
Fort Jackson, La	1,039.0	.....	−1.68	Feb. 13, 14, 16, 18, 19, 21, 1907.	8.3	Apr. 12	7.6	−0.7	Nov. 12, 14, 1894; Dec. 7, 1893.	0.3	Jan. 31	1.3	+ 1.0

[a] High water of June 28, 1844, would read 41.4 feet.
[b] Gauge transferred to New Madrid in 1893.
[c] 276.19 feet by ordinary levels of 1905.
[d] 250.57 feet by ordinary levels of 1905.

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TABLE No. 1.—*Highest and lowest gauge readings of 1909*—Continued.

TRIBUTARIES OF MISSISSIPPI RIVER AND THE ATCHAFALAYA.

River.	Station.	Approximate distance of station from—	Elevation of gauge zero above—		Highest.					Lowest.				
					Prior to 1909.		1909.		Difference compared with previous highest.	Prior to 1909.		1909.		Difference compared with previous lowest.
			Cairo datum plane.	Mean Gulf level.	Date.	Gauge reading.	Date.	Gauge reading.		Date.	Gauge reading.	Date.	Gauge reading.	
		Miles.	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Arkansas	Little Rock, Ark.	Mouth	176	241.53	May 21, 1892	31.20	May 29	25.20	−6.00	Oct. 23, 24, 1879	1.8	Oct. 22–25	1.40	−0.40
Do.[c]	Pine Bluff, Ark.	Mouth	110	200.34	May 22, 1892	30.50				Nov. 20–23, 1887	−0.40			
Atchafalaya	Barbre Landing, La.	Head	0		May 13, 14, 1897.	50.95	Apr. 7–9	43.00	−7.95	Oct. 26, 1887	−1.77	Oct. 26, 27	3.80	+5.57
Do.[b]	Simmesport, La.	Head	5		May, 1897	47.32	Apr. 8, 9	39.8	−7.52	Nov. 8, 1891	−3.5	Oct. 26–28	1.95	+5.45
Do.	Melville, La.	Head	31	0.44	June 22, 23, 1908.	39.7	Apr. 6–10	36.1	−3.6	Nov. 12, 13, 1894	1.0	do	5.8	+4.8
Cumberland	Nashville, Tenn.	Cairo	248	314.62	Jan. 22, 1882	55.30	Feb. 26	40.00	−15.30	Oct. 15, 16, 1878	−0.40	Oct. 9, Nov. 15	6.8	+7.20
Illinois	Peoria, Ill.	Mouth	160	448.96	Mar. 28, 29, 1904.	23.00	May 5	17.8	−5.20	Oct. 7, 1890	2.6	Jan. 4	8.3	+5.7
Do.[c]	Beardstown, Ill.	Mouth	86	444.29	1883	21.3				Aug. 11, 12, 1887	0.00			
Missouri	Kansas City, Mo.	Mouth	388	737.44	June 1, 2, 1903	[e]35.0	July 13	27.0	−8.0	Dec. 2, 1874[d]	1.5	Jan. 13	2.7	+1.2
Do.[c]	Coles Creek, Mo.	Mouth	107	433.97	May 15, 1892	26.76				Dec. 24, 1897	70.7			
Do	Hermann, Mo.	Mouth	103	502.17	June 6, 1903	[e]29.5	July 14	26.1	−3.4	Dec. 21, 22, 1878	−0.75	Jan. 18, 19	3.0	+3.75
Do	St. Charles, Mo.	Mouth	28	433.96	June 8, 1903	[f]33.96	July 15	31.80	−2.15	Dec. 26, 1879	3.53	Jan. 11	7.20	+3.67
Ohio	Cincinnati, Ohio	Cairo	498	429.25	Feb. 14, 1884	71.06	Feb. 28	54.6	−16.46	Sept. 18, 1881	1.92	Oct. 18	3.6	+1.68
Do	Louisville (upper), Ky.	Cairo	364	403.00	Feb. 16, 1884	46.60	Feb. 27	32.9	−13.70	Sept. 10–14, 18–22, 1881; Nov. 14–16, 1895.	1.70	Oct. 18	2.4	+0.70
Do	Louisville (lower), Ky.	Cairo	364	376.06	do	72.00	do	58.5	−13.50	Oct. 17, 18, 1872	1.60	do	3.8	+2.20
Do	Evansville, Ind.	Cairo	182	339.13	Feb. 19, 1884	48.8	Mar. 2	43.2	−5.6	Nov. 7, 8, 1895	−0.3	Oct. 19, 20	2.4	+2.7
Do	Paducah, Ky.	Cairo	45	286.26	Feb. 23, 1884	54.25	Mar. 5, 6	44.5	−9.75	Oct. 30–Nov. 4, 1895	−0.7	Oct. 15, 16	1.7	+2.4
Do	Cairo, Ill.	Cairo	0	290.84	Feb. 27, 1883	52.17	Mar. 16, 17	47.27	−4.90	Dec. 24, 1871	−1.00	Oct. 15	6.94	+7.94
Ouachita	Camden, Ark.	Mo. Red Riv.	325	71.10	May 12, 1882	46.0	Mar. 13	31.00	−15.00	Aug. 29, 30, 1887	1.80	Oct. 7, 8	2.60	+0.80
Do	Monroe, La.	Mo. Red Riv.	175	30.97	1874	49.1	Mar. 29	30.5	−18.6	Nov. 1–10, 1908	−1.5	Sept. 13–20	−1.8	−0.3
Red	Fulton, Ark.	Mouth	508	294.48	July 17, 1876	55.75	June 21	20.50	−18.25	Oct. 20–22, 1896	0.10	Sept. 27, 28, Oct. 20, 26.	4.80	+4.70
Do.[c]	Garland, Ark.	Mouth	450	208.16	Mar. 24, 1894	22.50				Sept. 22–25, 1896	−0.20			
Do	Shreveport, La.	Mouth	320	140.99	May 28, 1892	35.76	June 23	10.2	−25.50	Dec. 2–4, 1894	−5.50	Oct. 30	−4.45	+1.05
Do	Alexandria, La.	Mouth	110	44.18	July 6, 1908	41.84	June 4	22.30	−19.54	Sept. 29, 1881	−3.7	Nov. 4	−0.72	+2.98

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St. Francis...	Bridge St. L., I. M. and S. Ry.	Mouth.....	100	.....	.....	Apr. 4-6, 1897..	41.6	Mar. 25, 26.	25.4	−16.2	Nov. 3-11, 1901.....	−0.05	Oct. 11-Nov. 14..	1.0	+1.05
Do.[a].....	Wittsburg, Ark..	Mouth.....	86	.....	.....	Apr. 28, 1886...	42.02	.....	.....	.....	Oct. 27-31, Nov. 10-14, 1892.	−3.60	.....	.....	.....
Tennessee....	Chattanooga, Tenn.	Cairo.....	509	.....	632.00	Mar. 11, 1867...	58.6	June 6.....	25.3	−33.3	Sept. 11-14, 1881, and Sept. 19, 1883.	0.00	Nov. 16-24, Dec. 3-6.	1.7	+1.70
Do.....	Florence, Ala....	Cairo.....	301	.....	400.85	Mar. 19, 1897...	32.20	Mar. 15....	19.60	−12.60	Oct., 1872, Sept. 18, 1878.	−0.76	Nov. 12-23, 28, Dec. 3-6.	0.30	+1.06
Do.....	Johnsonville, Tenn.	Cairo.....	141	.....	323.1	1892.....	48.0	Feb. 28....	32.9	−15.1	Oct. 26-Nov. 4, 1904.	−0.9	Oct. 13, 14, Nov. 16-24.	1.6	+2.5
Wabash.....	Mount Carmel, Ill.	Cairo.....	202	.....	377.7	Aug. 7, 1875....	28.3	Mar. 4.....	19.7	− 8.6	Nov. 7-23, 1895.....	−0.2	Jan. 1-25.....	1.4	+1.6
White.....	Jacksonport, Ark.	Mouth.....	360	.....	.....	Mar. 14, 1890...	33.35	Mar. 13....	26.70	− 6.65	Dec. 24, 1872.....	−1.10	Oct. 29, 30.....	0.13	+1.23
Do.....	Clarendon, Ark..	Mouth.....	134	158.9	.....	Mar. 20, 1890...	36.63	Mar. 21....	28.90	− 7.73	Nov. 22, 1897.....	4.07	Nov. 2, 3.....	6.35	+2.28
Yazoo.....	Yazoo City, Miss.	Mouth.....	65	.....	78.54	1892.....	36.50	Apr. 3-7....	25.9	−10.6	1875.....	−4.30	Nov. 14-17.....	−2.5	+1.80

[a] Discontinued.
[b] Record from May, 1892, to December, 1905, in part only.
[c] High water of June, 1844—37.0 feet.
[d] January 6 gauge read −0.1; probably affected by ice.
[e] High water of June, 1844, would read 35.6 feet.
[f] High water of June, 1844—39.57 feet.

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TABLE NO. 2.—*Cost of dredging operations May 1, 1909, to April 30, 1910.*

Class of work, or plant to which distributed.	Labor.	Office supplies.	Subsistence.	Fuel.	Lighting supplies.	Lubricants.	Material.	Permanent plant and outfit.	Repairs (nonpersonal service and materials).	Total.	Grand total.
Care of plant	$31,192.78	$86.10	$7,886.66	$9,670.66	$146.03	$294.69	$604.33				$49,881.25
Repairs to floating plant:											
Dredge Beta	5,810.68		1,407.73		8.80	63.85	1,866.42			$9,157.48	
Dredge Gamma	3,889.76		826.11		14.05	10.76	6,920.47		145.00	11,806.15	
Dredge Delta	1,774.89		416.30		13.14	31.85	316.17			2,552.35	
Dredge Epsilon	2,481.61		538.20	29.44	9.85	24.80	538.12			3,622.02	
Dredge Zeta	2,572.91		529.47	31.13	5.92	19.10	380.56			3,539.09	
Dredge Iota	4,539.88		1,023.76		8.82	88.39	1,486.01			7,146.86	
Dredge Kappa	5,088.83		1,042.65		6.86	49.95	1,341.66			7,529.95	
Dredge Henry Flad	4,820.81		1,013.85		4.79	149.35	706.39			6,695.19	
Dredge B. M. Harrod	2,550.70		533.19		4.88	63.86	1,784.31			4,936.94	
Steamer Sachem	1,631.61		351.40		5.05	43.70	240.66			2,272.42	
Steamer Choctaw	2,345.87		481.84		7.55	64.82	877.38			3,777.46	
Steamer Nokomis	2,470.61		557.61		1.25	12.00	1,319.69			4,361.16	
Steamer Wynoka	2,489.04		297.73		2.46	10.36	719.79			3,519.38	
Steamer Leota	2,217.65		428.03		14.31	28.31	547.01			3,235.31	
Steamer Search	2,958.62		597.19		4.08	9.80	679.09			4,248.87	
Steamer Vulcan	566.80		108.89		.43	1.04	84.49			761.65	
Steamer Venus	633.14		134.24		.51	2.64	206.44			976.97	
Steamer Mercury	430.59		107.91		.54	6.73	196.51			742.28	
Steamer Mars	463.36		107.41		.22		154.38			725.37	
Pile sinker No. 13	25.43		4.69		.11	.08	3.31			33.62	
Pile sinker No. 971	2,307.89		363.52		.32		573.03			3,244.76	
Pile sinker No. 981	1,647.90		298.54		.40	8.34	263.64			2,218.82	
Pile sinker No. 982	201.86		36.34				51.46			289.66	
Pile sinker No. 983	296.06		61.08		.50	.27	130.51			488.42	
Barge No. 041	121.49		15.04				8.24			144.77	
Barge No. 051	34.33		4.62				2.88			41.83	
Pump boat	48.69		10.03		1.47	1.82	45.17			107.18	
Skiffs	68.42		9.46				5.19			83.07	
Sectional docks	364.19		59.56		.11		60.76			484.62	
Total	54,853.62		11,366.39	60.57	116.42	691.91	21,509.74		145.00	88,743.65	88,743.65
Dredge Gamma (experimental suction)	1,061.45		228.69		.21	.22	76.17				1,366.74
Dredge Henry Flad (reconstruction)	4,437.92		752.69		.98	15.58	2,329.71		889.00		8,425.88

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Operations during low-water season, 1909:											
Dredge Beta	3,607.42	10.90	2,450.89	4,387.84	29.52	215.85	310.00			16,012.42	
Dredge Delta	10,600.32	14.37	3,024.48	5,712.44	68.95	531.07	224.71			20,176.34	
Dredge Iota	7,269.92	12.07	1,938.01	2,239.17	31.45	161.96	232.58			11,885.16	
Dredge Kappa	11,292.49	18.97	3,151.52	4,650.13	44.63	241.73	241.75			19,641.22	
Dredge Henry Flad	3,883.81	11.15	1,048.97	2,586.39	13.31	64.20	110.01			7,717.84	
Dredge B. M. Harrod	9,487.70	13.99	2,169.15	3,899.44	39.34	213.45	243.41			16,066.48	
Steamers Search and Sachem	8,142.95	59.85	1,114.91	2,592.60	26.09	78.38	56.82			12,071.60	
Steamer Leota	234.59		43.70	79.28	1.50	2.50	5.67			367.24	
Steamer Vulcan	2,787.27	50.19	704.89	473.21	23.24	32.62	23.16			4,094.58	
Steamer Patrol	703.64		138.65	537.22	2.50	10.85	6.25			1,399.11	
Steamer Venus	2,809.63	41.96	720.20	756.37	17.34	35.01	29.54			4,410.04	
Steamer Mercury	2,339.56	23.84	538.66	525.15	18.86	42.84	22.92			3,511.83	
Total	68,159.30	257.28	17,044.03	28,439.24	316.73	1,630.46	1,506.82			117,353.86	117,353.86
Construction of Side Haul Railway dry dock[a]	19.37		5.41				2.56				27.34
Permanent outfit								16,214.00			16,214.00
Buildings and grounds	3,953.14		751.13	2.00	16.56	85.98	1,162.98				5,971.79
Miscellaneous:											
Motor boats, altering skiffs to	128.39		22.99			.62	10.86			162.86	
Bending rolls, construction of							11.31			11.31	
Buoys, constructing							77.42			77.42	
Testing coal	362.50		64.20	37.68			4.66			469.04	
Testing oils	30.00		5.87		1.55		2.40			39.82	
Total	520.89		93.06	37.68	1.55	.62	106.65			760.45	760.45
Repairs to tools and appliances	647.33		129.25				169.10			945.68	
Repairs to outfit					.08		20.75			20.83	
Total	647.33		129.25		.08		189.85			966.51	966.51
Gardening	207.98		54.64								262.62
Total cost of dredging operations	165,053.78	343.38	38,311.95	38,210.15	598.56	2,719.46	27,488.81	16,214.00	1,034.00		289,974.09

[a] Surveying site.

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TABLE No. 3.—*Depths over shoal crossings, Mississippi River below Cairo, low-water season of 1909.*

Name of crossing.	Miles below Cairo.	Dates of trips.				
		Aug. 6 to Aug. 8.	Aug. 12 to Aug. 13.	Aug. 16.	Aug. 19 to Aug. 21.	Aug. 25.
		Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Cairo gauge	0	19.6 to 20.0	19.6 to 18.8	16.8	15.0 to 15.7	19.4
Medleys	31				15	
Lesters	55				21½	
Slough	60				19	
Morrissons	69					
New Madrid gauge	70	17.0 to 17.0	16.7 to 16.3	14.8	13.2 to 13.0	16.2
Watsons	74					
Nolans	76				24	
Toneys	77					
Point Pleasant	80	12			11	
Linda	82	18			17	
Cherokee	89	20			11½	
Joe Eckles	92	26			a 13½	
Bass	93					
Island 14 or Reelfoot	98	17	17		9½	
Fritz	101	26	20		13	
Hathaway	103	29	26		25	
Foot of Island 16	121	23	23			
Cottonwood Point gauge	123	14.9 to 14.4	14.3 to 14.0	12.5	10.6 to 9.8	13.0
Island 20	128	20	30+			
Foot of Island 21	131	22	24		21	
Wrights Point	133	30+	26		30+	
Hales Point	136	21	25		20	
River Styx	139		21			
Forked Deer	146		17		17½	
O'Donnells	150		18		19	
Fletchers	153	21	23		21	
Gold Dust or Round Lake	158	14	16		12½	
New Haven	162	18	18		15	
Plum Point	165	18	23			
Foot of Bullerton	167	18	20		15	
Fulton gauge	175	14.2	14.0 to 13.8	12.8	11.5 to 10.8	12.8
Hatchie	178	11	12			
Island 34	180				b 11½	
Morgans Point	181	15	17½		17½	
Bend of Island 35	193	15				
Pecan Point	196	17	17	17	11½	
Walts	201	15	19		19	
Corona	204	18	16	15½	18	
Old River	208	22	23		22	
Arthur	223	24½				
Memphis gauge	230	16.1 to 15.4	15.1 to 14.9	14.0	12.6 to 11.6	13.6
Head of Presidents Island	233					15
Nonconnah	235					14
Wynoke	238					10½
Foot of Presidents Island	239					16½
Armstrongs	241					
Horn Lake	244					16
Daisy	252					17
Harcklerodes	255					
Star	259					
Polks	264					
Head of McCulloughs Tow Head	269					
Foot of McCulloughs or Peters	270					

a Bend.

b Dredged channel.

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TABLE No. 3.—*Depths over shoal crossings, Mississippi River below Cairo, low-water season of 1909*—Continued.

Name of crossing.	Miles below Cairo.	Dates of trips. Aug. 6 to Aug. 8.	Aug. 12 to Aug. 13.	Aug. 16.	Aug. 19 to Aug. 21.	Aug. 25.
		Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Fox Burns	275					
Mhoon Landing gauge	276					
Hardins Point	287					
Helena gauge	306					
Montezuma	312					
Friars Point	319					
Ledbetter	328					
Bend of Island 63	332					
Foot of Island 63	333					
Sunflower Landing gauge	353					
Andersons	359					
Island 68	364					
Parkers	367					
Victoria	391					
Mouth of White River gauge	393					
Indian Point	408					
Jersey Point	421					
Foot of Catfish Tow Head	422					
Arkansas City gauge	438					
Moss Lake	455					
Saloma	476					
Greenville gauge	478					
Longwood, Miss	500					
Foot of Grand Lake Tow Head	513					
Wilsons Point	531					
Stack Island	541					
Lake Providence gauge	542					
Homestead	556					
Arcadia	561					
Salem	564					
Hendersons	573					
Vicksburg gauge	599					

Name of crossing.	Miles below Cairo.	Dates of trips. Aug. 26 to Aug. 27.	Aug. 30 to Sept. 1.	Sept. 3 to Sept. 5.	Sept. 7 to Sept. 9.	Sept. 10 to Sept. 12.
		Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Cairo gauge	0	18.9 to 17.8	14.6 to 14.0	13.4 to 12.2	11.7 to 12.2	12.1 to 12.0
Medleys	31					
Lesters	55					
Slough	60					
Morrisons	69					
New Madrid gauge	70	16.0 to 15.4	12.9 to 12.4	11.8 to 11.1	10.6 to 10.9	10.8 to 10.7
Watsons	74					
Nolans	76					
Toneys	77					
Point Pleasant	80	a 15	11	12	a 12	a 12

a Dredged channel.

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TABLE No. 3.—*Depths over shoal crossings, Mississippi River below Cairo, low-water season of 1909*—Continued.

Name of crossing.	Miles below Cairo.	Dates of trips. Aug. 26 to Aug. 27.	Aug. 30 to Sept. 1.	Sept. 3 to Sept. 5.	Sept. 7 to Sept. 9.	Sept. 10 to Sept. 12.
		Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Linda	82	20	17	15½	13½	17
Cherokee	89	17	.....	13	14	14½
Joe Eckles	92	22	◦ 17	22	19	.....
Bass	93	25	.....	.....	.....	.....
Island 14 or Reelfoot	98	14	13	11	11	10½
Frits	101	20	16½	14	14	12½
Hathaway	103	30+	30+	.....	.....	.....
Foot of Island 16	121	.....	.....	.....	15	.....
Cottonwood Point gauge	123	13.4 to 13.0	11.1 to 9.7	8.9 to 8.1	7.5 to 7.4	7.6 to 7.4
Island 20	128	.....	.....	.....	22	.....
Foot of Island 21	131	24	23	.....	15	.....
Wrights Point	133	30+	.....	.....	.....	.....
Hales Point	136	18	18	.....	14	18½
River Styx	139	20	.....	.....	.....	18½
Forked Deer	146	17	16	.....	14	15½
O'Donnells	150	18	16	.....	.....	16
Fletchers	153	20	.....	20	.....	.....
Gold Dust or Round Lake	158	16	14	13	11	11
New Haven	162	16½	16	13	13	13
Plum Point	165	.....	.....	14	20	.....
Foot of Bullerton	167	20	15	14	14	13
Fulton gauge	175	13.1 to 13.0	11.3 to 10.7	10.2 to 9.6	9.2 to 8.9	9.1 to 9.1
Hatchie	178	11	.....	.....	.....	.....
Island 34	180	♭ 10	10	12½	11	♭ 14
Morgans Point	181	20	13½	17	15½	15
Bend of Island 35	193	.....	.....	.....	.....	.....
Pecan Point	196	15	.....	11	10	12
Walts	201	20	22	13	12½	15
Corona	204	24	22	14	13	13½
Old River	208	.....	.....	16	14	17
Arthur	223	.....	.....	.....	.....	.....
Memphis gauge	230	13.9 to 14.1	13.0 to 11.6	10.9 to 10.4	9.9 to 9.4	9.4 to 9.6
Head of Presidents Island	233	.....	.....	.....	.....	◦ .....
Nonconnah	235	.....	.....	.....	.....	.....
Wynoke	238	.....	.....	.....	.....	.....
Foot of Presidents Island	239	.....	.....	.....	.....	.....
Armstrongs	241	.....	.....	.....	.....	.....
Horn Lake	244	.....	.....	.....	.....	.....
Daisy	252	.....	.....	.....	.....	.....
Harcklerodes	255	.....	.....	.....	.....	.....
Star	259	.....	.....	.....	.....	.....
Polks	264	.....	.....	.....	.....	.....
Head of McCulloughs Tow Head	269	.....	.....	.....	.....	.....
Foot of McCulloughs or Peters	270	.....	.....	.....	.....	.....
Fox Burns	275	.....	.....	.....	.....	.....
Mhoon Landing gauge	276	.....	.....	8.3 to 7.4	6.6 to 5.8	5.7 to 6.0
Hardins Point	287	.....	.....	.....	.....	.....
Helena gauge	306	.....	.....	13.0 to 12.1	11.5 to 10.8	10.6 to 10.8
Montezuma	312	.....	.....	.....	.....	.....
Friars Point	319	.....	.....	.....	.....	.....
Ledbetter	328	.....	.....	.....	.....	.....
Bend of Island 63	332	.....	.....	.....	.....	.....
Foot of Island 63	333	.....	.....	.....	.....	.....

◦ Outside. ♭ Dredged channel.

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TABLE No. 3.—*Depths over shoal crossings, Mississippi River below Cairo, low-water season of 1909*—Continued.

Name of crossing.	Miles below Cairo.	Dates of trips. Aug. 26 to Aug. 27.	Aug. 30 to Sept. 1.	Sept. 3 to Sept. 5.	Sept. 7 to Sept. 9.	Sept. 10 to Sept. 12.
		Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Sunflower Landing gauge	353	.....	.....	14.4 to 13.5	12.8 to 12.0	11.9 to 11.8
Andersons	359	.....	.....	.....	.....	.....
Island 68	364	.....	.....	.....	.....	.....
Parkers	367	.....	.....	.....	.....	.....
Victoria	391	.....	.....	.....	.....	.....
Mouth of White River gauge	393	.....	.....	18.4 to 17.0	16.4 to 15.6	15.3 to 15.0
Indian Point	408	.....	.....	.....	.....	.....
Jersey Point	421	.....	.....	.....	.....	.....
Foot of Catfish Tow Head	422	.....	.....	.....	.....	.....
Arkansas City gauge	438	.....	.....	15.9 to 14.3	13.5 to 12.5	12.4 to 11.8
Moss Lake	455	.....	.....	.....	.....	.....
Salona	476	.....	.....	.....	.....	.....
Greenville gauge	478	.....	.....	12.5 to 11.0	10.3 to 9.4	9.2 to 8.7
Longwood, Miss	500	.....	.....	.....	.....	.....
Foot of Grand Lake Tow Head	513	.....	.....	.....	.....	.....
Wilsons Point	531	.....	.....	.....	.....	.....
Stack Island	541	.....	.....	.....	.....	.....
Lake Providence gauge	542	.....	.....	12.8 to 11.2	10.4 to 9.6	9.3 to 8.6
Homestead	556	.....	.....	.....	.....	.....
Arcadia	561	.....	.....	.....	.....	.....
Salem	564	.....	.....	.....	.....	.....
Hendersons	573	.....	.....	.....	.....	.....
Vicksburg gauge	599	.....	.....	14.6 to 13.2	12.1 to 11.0	10.8 to 10.0

Name of crossing.	Miles below Cairo.	Dates of trips. Sept. 16 to Sept. 18.	Sept. 20 to Sept. 22.	Sept. 24 to Sept. 25.	Sept. 29 to Oct. 1.	Oct. 8 to Oct. 10.
		Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Cairo gauge	0	12.9 to 12.0	11.5 to 11.6	12.0 to 11.5	10.1 to 10.2	8.5 to 7.8
Medleys	31	.....	.....	.....	.....	.....
Lesters	55	.....	.....	.....	.....	.....
Slough	60	.....	.....	.....	.....	.....
Morrisons	69	.....	.....	.....	.....	.....
New Madrid gauge	70	11.3 to 10.8	10.3 to 10.2	10.4 to 10.4	9.2 to 8.9	7.9 to 7.4
Watsons	74	.....	.....	.....	.....	.....
Nolans	76	.....	.....	.....	.....	.....
Toneys	77	.....	.....	.....	.....	.....
Point Pleasant	80	12	.....	13½	12	10½

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TABLE No. 8.—*Depths over shoal crossings, Mississippi River below Cairo, low-water season of 1909*—Continued.

Name of crossing.	Miles below Cairo.	Dates of trips.				
		Sept. 16 to Sept. 18.	Sept. 20 to Sept. 22.	Sept. 24 to Sept. 25.	Sept. 29 to Oct. 1.	Oct. 8 to Oct. 10.
		Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Linda	82	.....	.....	16	12	13
Cherokee	89	15	.....	16	13	13
Joe Eckles	92	16	.....	15	12½	11
Bess	93	.....	.....	22	13	.....
Island 14 or Reelfoot	98	12½	.....	11½	9½	13
Frits	101	15	.....	15	11½	16½
Hathaway	103	.....	.....	21	19½	.....
Foot of Island 16	121	20	.....	15	22	19
Cottonwood Point gauge	123	7.8 to 7.6	7.1 to 6.7	6.8 to 6.9	5.6 to 5.2	4.2 to 3.4
Island 20	128	.....	.....	23	13	.....
Foot of Island 21	131	22	.....	.....	19	.....
Wrights Point	133	.....	.....	.....	13	.....
Hales Point	138	19	.....	19	13	16
River Styx	139	.....	.....	15	14	14½
Forked Deer	146	13	.....	15	11	10
O'Donnells	150	16	.....	16	14½	13
Fletchers	153	20	.....	13	13	.....
Gold Dust or Round Lake	158	11½	.....	11	11	13
New Haven	162	13½	.....	12½	11½	10½
Plum Point	165	.....	.....	11	17	.....
Foot of Bullerton	167	14	.....	13	13	11
Fulton gauge	175	9.1 to 8.3	8.9 to 8.6	8.5 to 8.6	7.9 to 7.6	7.0 to 6.4
Hatchie	178	.....	.....	.....	.....	.....
Island 34	180	14	.....	13	13	13
Morgans Point	181	.....	.....	15	13	13½
Bend of Island 35	193	.....	.....	.....	.....	.....
Pecan Point	196	13½	.....	12	13	10
Walts	201	14	.....	14	13	12
Corona	204	14	.....	14	14½	13
Old River	208	14½	.....	14	14	13
Arthur	223	.....	.....	.....	.....	.....
Memphis gauge	220	9.4 to 9.9	9.5 to 9.2	8.9 to 8.9	8.4 to 7.9	7.2 to 6.6
Head of Presidents Island	233	.....	.....	.....	.....	.....
Nonconnah	235	.....	.....	.....	.....	.....
Wynoke	238	.....	10	.....	.....	.....
Foot of Presidents Island	239	.....	.....	.....	.....	.....
Armstrongs	241	.....	.....	.....	.....	.....
Horn Lake	244	.....	.....	.....	.....	.....
Daisy	253	.....	11	.....	.....	.....
Harckierodes	255	.....	19½	.....	.....	.....
Star	259	.....	16	.....	.....	.....
Pelks	264	.....	19	.....	.....	.....
Head of McCulloughs Tow Head	269	.....	19	.....	.....	.....
Foot of McCulloughs or Peters	270	.....	25	.....	.....	.....
Fox Burns	275	.....	21	.....	.....	.....
Mhoon Landing gauge	276	5.7 to 6.3	6.1 to 5.6	5.1 to 5.0	4.5 to 3.7	3.0 to 2.2
Hardins Point	287	.....	23	.....	.....	.....
Helena gauge	308	10.4 to 10.8	10.3 to 10.4	10.0 to 9.8	9.6 to 8.8	8.0 to 7.4
Montezuma	312	.....	13	.....	.....	.....
Friars Point	319	.....	.....	.....	.....	.....
Ledbetter	328	.....	15	.....	.....	.....
Bend of Island 63	332	.....	.....	.....	.....	.....
Foot of Island 63	333	.....	.....	.....	.....	.....

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TABLE No. 3.—*Depths over shoal crossings, Mississippi River below Cairo, low-water season of 1909*—Continued.

Name of crossing.	Miles below Cairo.	Dates of trips.				
		Sept. 16 to Sept. 18.	Sept. 20 to Sept. 22.	Sept. 24 to Sept. 25.	Sept. 29 to Oct. 1.	Oct. 8 to Oct. 10.
		Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Sunflower Landing gauge	353	11.6 to 12.1	12.2 to 12.2	11.5 to 11.4	10.8 to 10.2	9.4 to 8.6
Andersons	359	.....	.....	.....	.....	.....
Island 68	364	.....	13	.....	.....	.....
Parkers	367	.....	15	.....	.....	.....
Victoria	391	.....	.....	.....	.....	.....
Mouth of White River gauge	398	14.8 to 15.0	15.4 to 15.4	15.0 to 14.5	14.2 to 13.4	12.4 to 11.8
Indian Point	408	.....	12½	.....	.....	.....
Jersey Point	421	.....	.....	.....	.....	.....
Foot of Catfish Tow Head	422	.....	18½	.....	.....	.....
Arkansas City gauge	438	11.8 to 11.6	12.0 to 12.4	12.0 to 11.4	10.9 to 10.4	9.1 to 8.6
Moss Lake	455	.....	16	.....	.....	.....
Salome	476	.....	13	.....	.....	.....
Greenville gauge	478	8.6 to 8.4	8.8 to 9.1	8.9 to 8.5	8.0 to 7.4	.....
Longwood, Miss	500	.....	17	.....	.....	.....
Foot of Grand Lake Tow Head	513	.....	14	.....	.....	.....
Wilsons Point	531	.....	15	.....	.....	.....
Stack Island	541	.....	11	.....	.....	.....
Lake Providence gauge	542	8.5 to 8.3	8.5 to 9.1	8.8 to 8.4	7.7 to 7.4	.....
Homestead	556	.....	15	.....	.....	.....
Arcadia	561	.....	18	.....	.....	.....
Salem	564	.....	11	.....	.....	.....
Hendersons	573	.....	14½	.....	.....	.....
Vicksburg gauge	599	9.6 to 9.4	9.4 to 10.2	10.1 to 9.7	8.9 to 8.6	.....

Name of crossing.	Miles. below Cairo.	Dates of trips.				
		Oct. 11 to Oct. 13.	Oct. 15 to Oct. 17.	Oct. 18 to Oct. 21.	Oct. 24 to Oct. 27.	Oct. 28 to Oct. 29.
		Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Cairo gauge	0	7.6 to 7.2	7.0 to 7.2	7.2 to 9.7	10.3 to 9.2	9.0 to 8.7
Medleys	31	.....	9	.....	.....	.....
Lesters	55	.....	12	.....	16	.....
Slough	60	.....	10	.....	10½	.....
Morrissons	69	.....	14	.....	16	.....
New Madrid gauge	70	7.3 to 7.0	6.8 to 6.7	6.8 to 8.0	8.9 to 8.2	8.0 to 7.7
Watsons	74	.....	.....	.....	20	.....
Nolans	76	.....	.....	.....	.....	.....
Toneys	77	.....	12	.....	14	.....
Point Pleasant	80	10	10	.....	*10½	.....
Linda	82	12	14	.....	14	.....
Cherokee	89	11½	11	.....	14	.....

* One cut.

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TABLE No. 3.—*Depths over shoal crossings, Mississippi River below Cairo, low-water season of 1909*—Continued.

Name of crossing.	Miles below Cairo.	Dates of trips. Oct. 11 to Oct. 13.	Oct. 15 to Oct. 17.	Oct. 18 to Oct. 21.	Oct. 24 to Oct. 27.	Oct. 28 to Oct. 29.
		Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Joe Eckles	92	12	12	.....	13	.....
Bess	93	.....	.....	.....	.....	.....
Island 14 or Reelfoot	98	13	11	.....	13	.....
Frits	101	10½	12	.....	11	.....
Hathaway	103	22	.....	.....	.....	.....
Foot of Island 16	121	.....	.....	.....	20	.....
Cottonwood Point gauge	123	3.2 to 2.6	2.4 to 2.2	2.2 to 3.3	4.8 to 4.4	4.2 to 3.9
Island 20	128	20	.....	.....	.....	.....
Foot of Island 21	131	15	13	.....	19	.....
Wrights Point	133	20	.....	.....	.....	.....
Hales Point	136	15	14	.....	15	.....
River Styx	139	13	12	.....	15	.....
Forked Deer	146	12	12	.....	15	.....
O'Donnells	150	12½	12	.....	15	.....
Fletchers	153	.....	15	.....	.....	.....
Gold Dust or Round Lake	158	10½	11½	.....	14	.....
New Haven	162	11	a 13	.....	11	.....
Plum Point	165	16	.....	.....	19	.....
Foot of Bullerton	167	11	10	.....	15	.....
Fulton gauge	175	6.2 to 5.8	5.6 to 5.4	5.4 to 5.9	7.0 to 7.0	6.9 to 6.6
Hatchie	178	.....	.....	.....	.....	.....
Island 34	180	14	13	.....	15	.....
Morgans Point	181	13	12	.....	13	.....
Bend of Island 35	193	10	11	.....	12	.....
Pecan Point	196	b 9½	12	.....	13	.....
Walts	201	b 9	9	.....	12	.....
Corona	204	10	13	.....	11	.....
Old River	208	10½	13	.....	12	.....
Arthur	223	.....	.....	.....	.....	.....
Memphis gauge	230	6.5 to 6.0	5.9 to 5.6	5.4 to 5.8	6.9 to 7.4	7.2 to 6.8
Head of Presidents Island	233	.....	.....	.....	.....	.....
Nonconnah	235	.....	.....	.....	.....	.....
Wynoke	238	.....	.....	.....	.....	9
Foot of Presidents Island	239	.....	.....	.....	.....	13
Armstrongs	241	.....	.....	.....	.....	10
Horn Lake	244	.....	.....	11	.....	10
Daisy	252	.....	.....	11	.....	12
Harcklerodes	255	.....	.....	20	.....	15
Star	259	.....	.....	11	.....	14
Polks	264	.....	.....	22	.....	15
Head of McCulloughs Tow Head	269	.....	.....	14	.....	15
Foot of McCulloughs or Peters	270	.....	.....	10½	.....	15
Fox Burns	275	.....	.....	9½	.....	11½
Mhoon Landing gauge	276	2.0 to 0.9	0.8 to 0.4	0.3 to 0.5	1.4 to 3.1	3.0 to 2.6
Hardins Point	287	.....	.....	19	.....	21
Helena gauge	306	7.2 to 6.8	6.4 to 5.8	5.8 to 5.8	6.7 to 7.7	7.6 to 7.4
Montezuma	312	.....	.....	9½	.....	.....
Friars Point	319	.....	.....	11	.....	.....
Ledbetter	328	.....	.....	12½	.....	.....
Bend of Island 63	332	.....	.....	11	.....	.....
Foot of Island 63	333	.....	.....	12	.....	.....

a Outside.

b Not best water.

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TABLE No. 3.—*Depths over shoal crossings, Mississippi River below Cairo, low-water season of 1909*—Continued.

Name of crossing.	Miles below Cairo.	Dates of trips.				
		Oct. 11 to Oct. 13.	Oct. 15 to Oct. 17.	Oct. 18 to Oct. 21.	Oct. 24 to Oct. 27.	Oct. 28 to Oct. 29.
		Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Sunflower Landing gauge	353	8.6 to 8.0	7.8 to 7.4	7.4 to 7.2	8.0 to 9.1	9.2 to 8.9
Andersons	359	.....	.....	11	.....	.....
Island 68	364	.....	.....	.....	.....	.....
Parkers	367	.....	.....	12	.....	.....
Victoria	391	.....	.....	15	.....	.....
Mouth of White River gauge	393	11.8 to 11.0	10.6 to 10.0	10.0 to 9.7	10.3 to 11.8	11.9 to 11.8
Indian Point	408	.....	.....	11½	.....	.....
Jersey Point	421	.....	.....	13	.....	.....
Foot of Catfish Tow Head	422	.....	.....	9½	.....	.....
Arkansas City gauge	438	8.4 to 7.5	7.0 to 6.4	6.3 to 5.9	6.3 to 8.0	8.2 to 8.3
Moss Lake	455	.....	.....	.....	.....	.....
Salona	476	.....	.....	.....	.....	.....
Greenville gauge	478	.....	.....	.....	.....	.....
Longwood, Miss	500	.....	.....	.....	.....	.....
Foot of Grand Lake Tow Head	513	.....	.....	.....	.....	.....
Wilsons Point	531	.....	.....	.....	.....	.....
Stack Island	541	.....	.....	.....	.....	.....
Lake Providence gauge	542	.....	.....	.....	.....	.....
Homestead	556	.....	.....	.....	.....	.....
Arcadia	561	.....	.....	.....	.....	.....
Salem	564	.....	.....	.....	.....	.....
Hendersons	573	.....	.....	.....	.....	.....
Vicksburg gauge	599	.....	.....	.....	.....	.....

Name of crossing.	Miles below Cairo.	Dates of trips.				
		Nov. 2 to Nov. 4.	Nov. 5.	Nov. 9 to Nov. 12.	Nov. 17 to Nov. 18.	Nov. 22 to Nov. 24.
		Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Cairo gauge	0	8.6 to 8.4	8.4	9.4 to 10.7	14.5 to 13.7	19.9 to 19.6
Medleys	31	.....	.....	.....	.....	.....
Lesters	55	.....	.....	.....	.....	.....
Slough	60	.....	.....	.....	.....	.....
Morrissons	69	.....	.....	.....	.....	.....
New Madrid gauge	70	7.4 to 7.4	7.3	8.0 to 8.5	12.6 to 12.0	16.5 to 16.9
Watsons	74	.....	.....	.....	.....	.....
Nolans	76	.....	.....	.....	.....	.....
Toneys	77	.....	.....	.....	.....	.....
Point Pleasant	80	9	.....	10½	.....	17
Linda	82	14	.....	13	.....	.....
Cherokee	89	14	.....	14	.....	.....
Joe Eckles	92	14	.....	11	.....	24
Bass	93	14	.....	.....	.....	.....
Island 14 or Reelfoot	98	9	.....	10½	15	19
Fritz	101	10½	.....	13	17	23
Hathaway	103	.....	.....	.....	.....	.....
Foot of Island 16	121	.....	.....	.....	.....	.....

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TABLE No. 8.—*Depths over shoal crossings, Mississippi River below Cairo, low-water season of 1909*—Continued.

Name of crossing.	Miles below Cairo.	Dates of trips.				
		Nov. 2 to Nov. 4.	Nov. 5.	Nov. 9 to Nov. 12.	Nov. 17 to Nov. 18.	Nov. 22 to Nov. 24.
		Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Cottonwood Point gauge	123	3.2 to 3.3	3.3	3.8 to 4.2	9.0 to 8.8	12.3 to 14.1
Island 20	128					
Foot of Island 21	131					
Wrights Point	133					
Hales Point	136	15		16		
River Styx	139	12		14		
Forked Deer	146			13	12	
O'Donnells	150	12		14		
Fletchers	153					
Gold Dust or Round Lake	158	9		11½	14	21
New Haven	162	9		12	15	20
Plum Point	165	14½		16		
Foot of Bullerton	167	11		14		
Fulton gauge	175	6.1 to 6.0	6.0	6.4 to 6.6	9.8 to 10.0	11.6 to 13.7
Hatchie	178				a 9	
Island 34	180	11		11	15	18
Morgans Point	181	15		15	15	
Bend of Island 35	193	13		13		
Pecan Point	196	10		10	11	16
Walts	201	11		12	16	
Corona	204	11		12	19	
Old River	208	12		12	18	
Arthur	223					
Memphis gauge	230	6.2 to 6.1	6.2	6.4 to 6.6	9.7 to 10.4	11.0 to 14.4
Head of Presidents Island	233					
Nonconnah	235		(b)			
Wynoke	238					
Foot of Presidents Island	239		12½			
Armstrongs	241		16			
Horn Lake	244		13	14		
Daisy	252		12	10		
Harcklerodes	255		16			
Star	259		12			
Polks	264		17	13½		
Head of McCulloughs Tow Head	269					
Foot of McCulloughs Tow Head or Peters	270					
Fox Burns	275		11	14		
Mhoon Landing gauge	276	1.7 to 1.4	1.4	1.7 to 2.1	5.8 to 7.6	7.8 to 12.8
Hardins Point	287					
Helena gauge	306	6.6 to 6.3	6.3	6.3 to 6.7	9.2 to 10.7	11.1 to 15.2
Montezuma	312					
Friars Point	319					
Ledbetter	328					
Bend of Island 63	332					
Foot of Island 63	333					
Sunflower Landing gauge	353					
Andersons	359					
Island 68	364					
Parkers	367					
Victoria	391					

a Upshore.
b 7½ feet was found, but was not controlling depth; a survey made Nov. 4 shows over 9 feet 200 feet wide.

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TABLE No. 3.—*Depths over shoal crossings, Mississippi River below Cairo, low-water season of 1909*—Continued.

Name of crossing.	Miles below Cairo.	Dates of trips. Nov. 2 to Nov. 4	Nov. 5.	Nov. 9 to Nov. 12.	Nov. 17 to Nov. 18.	Nov. 22 to Nov. 24.
		Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Mouth of White River gauge	393					
Indian Point	408					
Jersey Point	421					
Foot of Catfish Tow Head	422					
Arkansas City gauge	438					
Moss Lake	455					
Salona	476					
Greenville gauge	478					
Longwood, Miss	500					
Foot of Grand Lake Tow Head	513					
Wilsons Point	531					
Stack Island	541					
Lake Providence gauge	542					
Homestead	556					
Arcadia	561					
Salem	564					
Hendersons	573					
Vicksburg gauge	599					

Name of crossing.	Miles below Cairo.	Dates of trips. Nov. 29 to Nov. 30.	Dec. 16 to Dec. 17.	Dec. 22 to Dec. 23.	Dec. 28 to Dec. 29.	Jan. 1, '10 to Jan. 5, '10.
		Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Cairo gauge	0	17.9 to 18.0	20.2 to 19.7	17.5 to 15.6	11.2 to 10.2	8.9 to 8.2 to 10.2
Medleys	31					
Lesters	55					
Slough	60					
Morrissons	69					
New Madrid gauge	70	15.2 to 15.3	17.3 to 16.6	15.0 to 13.6	9.7 to 8.6	7.7 to 7.0 to 8.1
Watsons	74					
Nolans	76					
Toneys	77					
Point Pleasant	80					[a] 7½
Linda	82					
Cherokee	89					
Joe Eckles	92					
Bass	93					
Island 14 or Reelfoot	98					[b]
Frits	101					11
Hathaway	103					18
Foot of Island 16	121					
Cottonwood Point gauge	123	12.0 to 11.9	15.0 to 13.9	12.3 to 11.2	6.1 to 5.4	3.9 to 2.8 to 3.8
Island 20	128					
Foot of Island 21	131					
Wrights Point	133					

[a] From bar survey Jan. 4, 1910.
[b] Over 9 feet in Peck's Mill channel reported by survey boat.

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TABLE No. 3.—*Depths over shoal crossings, Mississippi River below Cairo, low-water season of 1909*—Continued.

Name of crossing.	Miles below Cairo.	Dates of trips.				
		Nov. 29 to Nov. 30.	Dec. 16 to Dec. 17.	Dec. 22 to Dec. 23.	Dec. 28 to Dec. 29.	Jan. 1, '10 to Jan. 5, '10.
		Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Hales Point	136					
River Styx	139					12
Forked Deer	146	19				14
O'Donnells	150					15
Fletchers	153					
Gold Dust or Round Lake	158	17			13	10
New Haven	162		21		12	9
Plum Point	165					
Foot of Bullerton	167		20			11
Fulton gauge	175	12.2 to 12.0	14.6 to 13.8	12.4 to 11.7	8.4 to 7.6	6.5 to 5.7 to 6.0
Hatchie	178	11	14½			
Island 34	180		13	13½	10	(a)
Morgans Point	181			21	16	12
Bend of Island 35	193				10	(a)
Pecan Point	196	13½		15	11	8
Walts	201	22				11
Corona	204	20	20			15
Old River	208	21				9½
Arthur	223					
Memphis gauge	230	13.0 to 12.8	16.4 to 15.4	13.3 to 12.7	9.2 to 8.1	6.7 to 5.8 to 6.0
Head of Presidents Island	233					
Nonconnah	235					
Wynoke	238					
Foot of Presidents Island	239					
Armstrongs	241					
Horn Lake	244					
Daisy	252					
Hercklerodes	255					
Star	259					
Polks	264					
Head of McCulloughs Tow Head	269					
Foot of McCulloughs or Peters	270					
Fox Burns	275					
Mhoon Landing gauge	276	12.0 to 11.6				
Hardins Point	287					
Helena gauge	306	15.7 to 15.0				
Montezuma	312					
Friars Point	319					
Ledbetter	328					
Bend of Island 63	332					
Foot of Island 63	333					
Sunflower Landing gauge	336					
Andersons	359					
Island 68	364					
Parkers	367					
Victoria	391					
Mouth of White River gauge	393					
Indian Point	408					
Jersey Point	421					
Foot of Catfish Tow Head	422					

a Over 9 feet reported by survey boat.

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TABLE No. 3.—*Depths over shoal crossings, Mississippi River below Cairo, low-water season of 1909*—Continued.

Name of crossing.	Miles below Cairo.	Dates of trips.				
		Nov. 29 to Nov. 30.	Dec. 16 to Dec. 17.	Dec. 22 to Dec. 23.	Dec. 28 to Dec. 29.	Jan. 1, '10 to Jan. 5, '10.
		Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Arkansas City gauge	438					
Moss Lake	455					
Salona	476					
Greenville gauge	478					
Longwood, Miss	500					
Foot of Grand Lake Tow Head	513					
Wilsons Point	531					
Stack Island	541					
Lake Providence gauge	542					
Homestead	556					
Arcadia	561					
Salem	564					
Hendersons	573					
Vicksburg gauge	599					

TABLE No. 4.—*Dimensions of channel through bars, Mississippi River below Cairo, dredging season of 1909, determined from surveys.*

Miles below Cairo.	Name of crossing.	Date of survey, 1909.	Least depth in channel 250 feet wide.	Least width of 9-foot channel.	Gauge and its reading at time of survey.	
					Reading.	Gauge.
			Feet.	*Feet.*	*Feet.*	
31	Medleys	Aug. 23	21.5	2,800	17.6	Columbus.
		Sept. 22	13.0	2,400	11.9	
		Oct. 3	12.0	2,100	10.5	
		Oct. 27	13.0	1,950	9.5	
		Dec. 4	17.0	3,000	16.6	
60	Slough	Oct. 21	16.0	700	7.8	New Madrid.
80	Point Pleasant (upper)	Aug. 10-11	15.0	1,500	17.0-16.9	New Madrid.
		Aug. 16-17	15.5	900	14.8-14.2	
		Aug. 27-30	12.0	1,100	15.6-13.6	
		Sept. 1-4	10.5	1,200	12.5-11.5	
		Sept. 9-10	10.0	1,000	10.8-10.8	
		Sept. 14-15	12.5	900	10.7-11.1	
		Sept. 29-30	12.0	1,100	9.2- 9.0	
		Oct. 18-19	9.5	275	6.8- 6.9	
		Oct. 25	11.0	500	8.9	
		Nov. 2	10.0	400	7.4	
		Nov. 8	9.5	350	7.8	
		Nov. 10	10.0	450	8.1	
		Nov. 23-24	18.5	900	17.1-17.0	
		Dec. 19	18.0	900	16.2	
		Jan. 4, 1910[a]	8.0	75	7.5	
81	Point Pleasant (lower)	Aug. 10-11	17.5	1,700	17.0-16.9	New Madrid.
		Aug. 16-17	14.0	900	14.8-14.2	
		Aug. 27-30	14.5	1,400	15.6-13.6	
		Sept. 1-4	10.5	700	12.5-11.5	
		Sept. 9-10	11.0	750	10.8-10.8	
		Sept. 14-15	13.0	600	10.7-11.1	
		Sept. 29-30	12.0	700	9.2- 9.0	
		Oct. 18-19	10.5	400	6.8- 6.9	
		Oct. 25	13.5	750	8.9	
		Nov. 2	11.0	900	7.4	
		Nov. 10	11.0	600	8.1	
		Nov. 23-24	19.5	2,200	17.1-17.0	
		Dec. 19	16.0	1,100	16.2	

[a] Ice in the river prevented dredging.

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TABLE No. 4.—*Dimensions of channel through bars, Mississippi River below Cairo, dredging season of 1909, determined from surveys*—Continued.

Miles below Cairo.	Name of crossing.	Date of survey, 1909.	Least depth in channel 250 feet wide.	Least width of 9-foot channel.	Gauge and its reading at time of survey.	
					Reading.	Gauge.
			Feet.	*Feet.*	*Feet.*	
92	Joe Eckles (middle)	Nov. 5–6	13.0	1,000	7.3– 7.4	New Madrid.
98	Island No. 14	Aug. 13	18.0	3,000	16.4	New Madrid.
		Aug. 24	17.5	3,000	15.7	
		Sept. 6	11.5	600	10.8	
		Sept. 16	13.0	800	11.3	
		Sept. 28	12.0	700	9.4	
		Oct. 8	10.5	300	7.9	
		Oct. 16–17	9.0	250	6.7– 6.7	
		Nov. 1	10.0	300	7.4	
		Nov. 29	18.0	2,300	15.1	
100	Pecks Mill	Oct. 10	10.0	400	7.5	New Madrid.
		Oct. 29–30	12.0	600	7.8– 7.6	
		Nov. 30	19.0	1,600	15.2	
101	Frits	Oct. 29–30	13.0	1,000	7.8– 7.6	New Madrid.
158	Gold Dust	Aug. 27	15.0	3,000	15.6	New Madrid.
		Sept. 23	12.0	450	10.2	
		Sept. 30	12.0	350	9.0	
		Oct. 12	10.5	450	7.2	
162	New Haven	Aug. 25	16.0	900	12.8	Fulton.
		Oct. 1	11.0	400	7.6	
		Oct. 12	9.0	250	5.9	
		Oct. 26	12.5	550	7.3	
167	Foot Bullerton	Oct. 21	12.0	1,000	5.8	Fulton.
180	Island No. 34	Aug. 12–13	10.0	800	14.0–13.9	Fulton.
		Aug. 23	12.0	400	11.2	
		Aug. 30	12.5	550	11.8	
		Sept. 7	9.5	350	9.2	
		Sept. 15	11.5	300	8.9	
		Sept. 17	10.0	350	9.4	
		Sept. 25	11.0	350	8.6	
		Oct. 4	9.0	300	7.4	
		Nov. 13	11.5	450	6.0	
		Nov. 26	17.0	2,800	13.2	
		Dec. 15–16	19.0	3,500	15.2–14.6	
		Dec. 17	19.0	3,500	14.0	
196	Pecan Point	Aug. 20	15.0	3,000	11.1	Fulton.
		Sept. 1	11.5	1,500	10.8	
		Sept. 4	10.5	1,800	10.0	
		Sept. 18	13.0	900	9.4	
		Oct. 5	11.0	400	7.4	
		Nov. 11	11.0	450	6.6	
		Dec. 3	15.5	1,900	11.8	
		Dec. 28	12.0	850	8.4	
		Jan. 3, 1910 [a]	9.0	325	6.0	
201	Walts	Oct. 6	12.0	1,300	7.2	Fulton.
204	Corona	Aug. 19	16.0	1,700	11.5	Fulton.
		Sept. 9	13.5	1,400	8.9	
		Oct. 9	14.0	1,300	6.7	
235	Nonconnah	Sept. 15	9.0	250	9.4	Memphis.
		Nov. 4	9.0	300	6.1	
		Jan. 1, 1910	10.0	250	6.8	
238	Wynoke (upper)	Sept. 13	11.0	1,200	9.6	Memphis.
		Oct. 1	10.5	800	7.9	
		Nov. 5	13.0	900	6.2	
		Dec. 27	13.0	1,200	10.0	
238.5	Wynoke (lower)	Sept. 13	12.0	450	9.6	Memphis.
		Oct. 1	11.5	800	7.9	
		Nov. 5	10.5	300	6.2	
		Dec. 27	17.0	1,500	10.0	

[a] Ice in the river prevented dredging.

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TABLE No. 4.—*Dimensions of channel through bars, Mississippi River below Cairo, dredging season of 1909, determined from surveys*—Continued.

Miles below Cairo.	Name of crossing.	Date of survey, 1909.	Least depth in channel 250 feet wide.	Least width of 9-foot channel.	Gauge and its reading at time of survey.	
					Reading.	Gauge.
			Feet.	*Feet.*	*Feet.*	
239	Foot President Island	Sept. 14	12.5	750	9.4	Memphis.
		Dec. 22	20.0	2,500	13.3	
244	Horn Lake	Aug. 21–22	16.0	1,100	11.7–11.5	Memphis.
		Sept. 17	17.0	1,700	9.6	
		Nov. 3	18.0	950	6.1	
		Dec. 21	24.0	1,100	13.6	
262	Daisy	Sept. 2	19.0	3,000	11.3	Memphis.
		Oct. 12–13	9.0	400	6.3 6.1	
		Oct. 20	11.5	350	5.6	
		Dec. 17	25.5	3,300	15.6	
312	Montezuma	Sept. 19	13.5	600	10.9	Helena.
		Oct. 16	10.5	350	6.2	
		Oct. 22	10.0	400	5.9	
		Oct. 27	13.5	800	7.7	
		Nov. 15	13.5	709	7.3	
		Dec. 15	26.0	4,100	20.8	
408	Indian Point	Oct. 8	13.0	1,600	12.4	Mouth of White River.
		Oct. 23	12.5	700	10.0	
		Nov. 12	13.0	1,100	11.0	
422	Catfish Tow Head	Oct. 7	12.5	800	9.2	Arkansas City.
		Oct. 24	11.0	600	6.3	
		Nov. 11	12.0	750	7.1	
476	Salona	Oct. 4–5	13.0	1,500	6.8 6.6	Greenville.
		Nov. 10	11.0	400	4.4	
534	Stack Island	Oct. 1	13.0	1,100	7.4	Lake Providence.
565	Salem	Sept. 29–30	18.0	2,100	8.9 8.8	Vicksburg.
		Nov. 8	13.0	1,100	3.7	Lake Providence.
764	Red River	Sept. 25–26	17.0	1,800	11.1–10.9	Red River Landing.

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TABLE No. 5.—*Summary of dredging operations, Mississippi River below Cairo, during the low-water season of 1909.*

BETA.

Points of operation.	Distribution of time.									Distance towed.	Number of cuts.	Total length of cuts.	Average rate of advance per hour.	Average depth suction lowered.	Average depth of cut.	Average steam pressure per square inch.	Average speed main pump, revolutions per minute.
	Placing plant.	Dredging.	Changing cuts.	Repairing.	Passing boats.	Making up tow.	Towing.	Not working, awaiting lower stage, etc.	Total.								
	Hours.	*Hours.*	*Hours.*	*Hours.*	*Hours.*	*Hours.*	*Hours.*	*Hours.*	*Hours.*	*Miles.*		*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Pounds.*	
Point Pleasant, upper (80), Sept. 7–Oct. 11	52.00	116.20	4.05	[a] 33.55	.....	3.00	202.45	410.25	822.30	152	6	9,790	84	15–20	4.4	149	126
Point Pleasant, upper (80), second time Oct. 11–13	6.30	42.30	2.30	2.00	.....	.....	.....	.....	53.30	.....	3	3,880	91	15–17	4.7	151	132
Medleys (31), Oct. 13–20	10.00	67.00	25.50	.....	.....	21.00	32.15	16.45	172.50	51	10	16,010	230	15–17	4.2	148	132
Point Pleasant, upper (80), third time Oct. 20–Nov. 11	8.10	[b] 99.15	2.30	[c] 23.35	.....	17.30	9.40	357.00	517.40	51	4	6,940	70	15–18	3.8	146	130
Going into winter quarters Nov. 11–14	.....	.....	.....	.....	.....	11.30	54.45	23.15	89.30	152	.....	.....	.....	.....	.....	.....	.....
Total and average	76.40	325.05	34.55	59.30	.....	53.00	299.25	807.25	1,656.00	406	23	36,620	113	15–20	4.2	148	130

DELTA.

Point Pleasant, upper (80), Aug. 10–Sept. 13	[d] 23.35	383.10	22.25	56.00	.....	3.00	[e] 120.30	[f] 224.30	833.10	152	26	16,210	42	15–18	3.3	136	128
Island 14 (98), Sept. 13–Oct. 19	16.10	[g] 177.05	18.20	55.35	1.00	12.35	4.40	568.15	853.40	19	13	11,495	65	15–18	4.3	136	129
Lower Slough Landing (60), Oct. 19–24	.....	.....	.....	.....	.....	.....	34.10	[h] 92.20	126.30	37	.....	.....	.....	.....	.....	.....	.....
Reelfoot (98), Oct. 24–Nov. 18; lying up	.....	.....	.....	.....	.....	.....	19.55	572.45	592.40	37	.....	.....	.....	.....	.....	.....	.....
Going into winter quarters: Nov. 18–22	.....	.....	.....	.....	.....	9.15	[i] 81.30	23.15	114.00	136	.....	.....	.....	.....	.....	.....	.....
Total and average	39.45	560.15	40.45	111.35	1.00	24.50	260.45	1,481.05	2,820.00	381	39	27,705	49	15–18	3.7	136	128

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IOTA.

Pecan Point (196) Sept. 4–Oct. 9	1.40	72.20	9.15	103.40	.....	15.15	48.05	f 596.45	847.00	36	14	11,900	164	16.4–18	3.1	139	143
Pecan Point (196) Oct. 9–Dec. 11, second time	1.20	48.55	6.10	5.20	4.10	.....	.....	1,454.05	1,520.00	.....	8	8,450	173	17	5.5	141	149
Going into winter quarters Dec. 11–14	.....	.....	.....	.....	.....	9.00	4.30	67.30	81.00	36	.....	.....	.....	.....	.....	.....	.....
Total and average	3.00	121.15	15.25	109.00	4.10	24.15	52.35	2,118.20	2,448.00	72	22	20,350	168	16.4–18	4.1	140	149

KAPPA.

Island No. 34 (180) Aug. 6–31	3.45	120.25	13.05	4.40	.....	.....	66.45	k 402.25	611.05	58	17	19,720	165	18	6.1	142	125
Island No. 34 (180) Aug. 31–Sept. 8, second time	1.10	47.10	3.50	.30	.15	.....	.....	136.20	189.15	.....	10	10,050	213	18	4.1	138	127
Island No. 34 (180) Sept. 8–29, third time	2.30	57.55	7.25	.....	.....	.....	.....	438.50	506.40	.....	12	11,550	199	17	4.4	140	127
Island No. 34 (180) Sept. 29–Oct. 4, fourth time	2.30	84.20	11.25	1.10	4.40	.....	.....	11.25	115.30	.....	17	18,200	216	16–17	3.8	143	127
Gold Dust (158) Oct. 4–7	.45	48.25	3.35	.30	.....	1.30	9.20	m 21.40	85.45	22	8	10,600	219	16	4.2	141	128
New Haven (162) Oct. 7–25	6.25	101.50	11.50	.20	2.15	1.45	1.10	299.40	425.15	4	13	13,175	129	15–16	4.1	136	126
Osceola Bar (164) Oct. 25–Dec. 26 (lying up)	.....	.....	.....	.....	.....	.....	1.00	1,486.30	1,487.30	2	.....	.....	.....	.....	.....	.....	.....
Caruthersville (110) Dec. 26, 1909–Jan. 3, 1910 (lying up)	.....	.....	.....	.....	.....	1.30	50.10	135.00	186.40	54	.....	.....	.....	.....	.....	.....	.....
Point Pleasant, lower (81), Jan. 3–6, 1910	8.00	20.20	1.30	.15	.....	2.00	31.35	n 12.40	76.20	30	3	3,100	153	16	3.7	145	125
Going into winter quarters Jan. 6–14, 1910	.....	.....	.....	.....	.....	4.20	o 68.10	p 131.30	204.00	152	.....	.....	.....	.....	.....	.....	.....
Total and average	25.05	480.35	52.40	7.25	7.10	11.05	228.10	3,076.00	3,888.00	322	80	86,395	180	15–18	4.5	140	126

a Includes 13 hours repairs to broken pile.
b Includes 3 hours removing snag from cut.
c Includes 18.05 hours repairing broken cables.
d Includes 15.50 hours replacing piles pulled over.
e Includes 10.20 hours cleaning boilers on towboat.
f Includes 13.20 hours cleaning boilers.
g Includes 6.50 hours removing logs from cut.
h Includes 16.15 hours cleaning boilers.
i Includes 31 hours tied up on account of high wind.
j Includes 29.10 hours cleaning boilers.
k Includes 26.25 hours cleaning boilers.
m Cleaning boilers.
n Lying up on account of snow and wind.
o Includes 5 hours taking on supplies.
p Includes 104.05 hours lying up on account of floating ice and 8.30 hours on account of fog.

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TABLE NO. 5.—*Summary of dredging operations, Mississippi River below Cairo, during the low-water season of 1909*—Continued.

HENRY FLAD.

Points of operation.	Distribution of time.									Distance towed.	Number of cuts.	Total length of cuts.	Average rate of advance per hour.	Average depth suction lowered.	Average depth of cut.	Average steam pressure per square inch.	Average speed main pump, revolutions per minute.
	Placing plant.	Dredging.	Changing cuts.	Repairing.	Passing boats.	Making up tow.	Towing.	Not working, awaiting lower stage, etc.	Total.								
	Hours.	*Hours.*	*Hours.*	*Hours.*	*Hours.*	*Hours.*	*Hours.*	*Hours.*	*Hours.*	*Miles.*		*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Pounds.*	
Nonconnah (236), Oct. 23–Nov. 6	5.55	150.00	20.10	22.40	0.15	11.05	3.35	[a] 130.35	344.15	4	7	5,325	36	12–15	5.9	137	131
Going to dredge fleet (232), Nov. 6	.....	.....	.....	.....	.....	.....	1.35	.....	1.35	4	.....	.....	.....	.....	.....	.....	.....
West Memphis (232), Nov. 6–9 (lying up)	.....	.....	.....	.....	.....	.....	.....	68.35	68.35	.....	.....	.....	.....	.....	.....	.....	.....
Dredge fleet (232), Nov. 9–11	[b] 3.35	16.10	1.05	19.30	.....	.....	.....	8.15	48.35	.....	4	1,250	77	20.0	4.1	136	132
West Memphis (232), Nov. 11–Dec. 10 (lying up)	.....	.....	.....	.....	.....	.....	.20	712.40	713.00	.....	.....	.....	.....	.....	.....	.....	.....
Pecan Point (196), Jan. 1–7, 1910	7.10	25.45	.25	.....	.....	8.15	43.50	66.25	151.50	36	2	1,500	58	15	4.2	134	130
Going into winter quarters, Jan. 7, 1910	.....	.....	.....	.....	.....	.....	5.40	10.30	16.10	36	.....	.....	.....	.....	.....	.....	.....
Total and average	16.40	191.55	21.40	42.10	.15	19.20	55.00	997.00	1,344.00	80	13	8,075	42	12–20	5.3	135	131

B. M. HARROD.

New Haven (162), Aug. 20–31	.....	.....	.....	.....	.....	.....	22.45	265.15	288.00	70	.....	.....	.....	.....	.....	.....	.....
Point Pleasant, lower (81), Sept. 1–25	5.15	76.10	8.35	1.00	.....	.....	47.35	444.05	582.40	82	9	15,200	290	16–18	7.5	145	135
West Memphis (232), Sept. 25–Oct. 14 (lying up)	.....	.....	.....	.....	.....	4.35	47.15	403.30	455.20	152	.....	.....	.....	.....	.....	.....	.....
Daisy (252), Oct. 14–19	5.45	83.55	2.40	2.00	.....	3.30	4.00	16.00	117.50	20	9	17,700	211	16–18	8.0	141	135
Montezuma (312), Oct. 19–24	2.30	34.45	2.30	.....	.....	1.00	30.10	52.00	122.55	62	7	8,900	256	16–18	6.2	141	135
Helena (306), Oct. 24–Nov. 15 (lying up)	.....	.....	.....	.....	.....	1.45	2.15	523.15	527.15	6	.....	.....	.....	.....	.....	.....	.....
West Memphis (232), Nov. 15–Dec. 29 (lying up)	.....	.....	.....	.....	.....	.....	34.30	1,025.30	1,060.00	72	.....	.....	.....	.....	.....	.....	.....
Pecan Point (196), Dec. 29–Jan. 1, 1910 [c]	.....	.....	.....	.....	.....	4.00	1.00	69.30	74.30	2	.....	.....	.....	.....	.....	.....	.....
Going into winter quarters, Jan. 1, 1910	.....	.....	.....	.....	.....	2.00	2.00	7.30	11.30	2	.....	.....	.....	.....	.....	.....	.....
Total and average	13.30	194.50	13.45	3.00	.....	16.50	191.30	2,806.35	3,240.00	468	25	41,800	215	16–18	7.5	142	135

[a] Includes 36.25 hours cleaning boilers and repairs to machinery.
[b] Includes 2.40 hours resetting pile pulled out.
[c] Dredge started for Pecan Point, but on account of ice getting in condenser well when opposite Memphis she had to return to the fleet and was laid up.

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TABLE No. 6.—*Highest gauge readings, Mississippi River and tributaries, in 1910, to June 30.*

[See Table No. 1 for highest known readings.]

River.	Station.	Date.	Gauge readings.
		1910.	*Feet.*
Mississippi	St. Paul, Minn	March 22	[a] 10.40
Do	Rock Island, Ill	March 24-25	8.00
Do	Hannibal, Mo	March 20-21	10.90
Do	Grafton, Ill	May 10	14.30
Do	St. Louis, Mo	....do	[b] 24.90
Do	Chester, Ill	May 11	22.20
Do	Grand Tower, Ill	....do	24.40
Do	Cape Girardeau, Mo	....do	26.50
Do	Cairo, Ill. (Ohio River)	March 15	42.15
Do	Columbus, Ky	....do	39.52
Do	New Madrid, Mo	....do	34.39
Do	Cottonwood Point, Mo	March 16-17	32.70
Do	Fulton, Tenn	March 17	30.00
Do	Memphis, Tenn	March 19	33.12
Do	Mhoon Landing, Miss	March 19-20	35.80
Do	Helena, Ark	March 21	40.70
Do	Sunflower Landing, Miss	March 21-22	39.00
Do	Mouth White River, Ark	March 23	44.45
Do	Arkansas City, Ark	....do	43.10
Do	Greenville, Miss	March 23-24	37.00
Do	Lake Providence, La	March 24-25	36.90
Do	Vicksburg, Miss	March 25-26	40.60
Do	St. Joseph, La	March 26-27	36.30
Do	Natchez, Miss	March 26-28	39.80
Do	Red River Landing, La	March 28	38.50
Do	Bayou Sara, La	March 27-29	31.60
Do	Baton Rouge, La	March 28	29.46
Do	Plaquemine, La	....do	25.52
Do	Donaldsonville, La	....do	22.95
Do	College Point, La	March 27-28	19.40
Do	Carrollton, La	March 29-30	12.95
Do	Fort Jackson, La	March 31, April 2-3	6.20
Arkansas	Little Rock, Ark	May 25	15.70
Atchafalaya	Barbre Landing, La	March 28-30	35.34
Do	Simmesport, La	March 30	32.40
Do	Melville, La	March 29-30	31.50
Cumberland	Nashville, Tenn	February 22	35.00
Illinois	Peoria, Ill	March 12-14	17.30
Missouri	Kansas City, Mo	March 24	20.20
Do	Hermann, Mo	June 11	20.30
Ohio	Cincinnati, Ohio	March 7	51.80
Do	Louisville, Ky. (upper)	March 8	[c] 24.30
Do	Louisville, Ky. (lower)	....do	[d] 49.70
Do	Evansville, Ind	March 10	39.70
Do	Paducah, Ky	March 11-13	36.20
Do	Cairo, Ill	March 15	42.15
Ouachita	Camden, Ark	April 17	33.10
Do	Monroe, La	May 2	28.70
Red	Fulton, Ark	April 19	22.55
Do	Shreveport, La	April 21	13.90
Do	Alexandria, La	April 23	22.38
St. Francis	Bridge, St. Louis, Iron Mountain and Southern Ry.	April 17-18	15.90
Tennessee	Chattanooga, Tenn	March 3	13.60
Do	Florence, Ala	February 22	11.70
Do	Johnsonville, Tenn	February 23-24	21.20
Wabash	Mount Carmel, Ill	March 9	21.90
White	Jacksonport, Ark	June 12	21.41
Do	Clarendon, Ark	June 5	25.36
Yazoo	Yazoo City, Miss	March 12-19	18.10

[a] River frozen to March 21.
[b] January 14, gauge read 31.9 due to ice gorge.
[c] January 18, gauge read 27.3 due to ice gorge.
[d] January 18, gauge read 53.8 due to ice gorge.

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APPENDIX 1 A.

LAWS AFFECTING THE MISSISSIPPI RIVER COMMISSION, JULY 1, 1909, TO JUNE 30, 1910.

[PUBLIC—No. 266.]

[H. R. 25552.]

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, nineteen hundred and eleven, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums be, and the same are hereby, appropriated, for the objects hereinafter expressed, for the fiscal year ending June thirtieth, nineteen hundred and eleven, namely:

* * * * * * *

Improving Mississippi River: For continuing improvement of Mississippi River from Head of Passes to the mouth of the Ohio River, including salaries and clerical, office, traveling, and miscellaneous expenses of the Mississippi River Commission, in completion of contract authorization, two million dollars.

* * * * * * *

Approved, June 25, 1910.

[PUBLIC—No. 264.]

[H. R. 20686.]

AN ACT Making appropriations for the construction, repair, and preservation of certain public works on rivers and harbors, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums of money be, and are hereby, appropriated, to be paid out of any money in the Treasury not otherwise appropriated, to be immediately available, and to be expended under the direction of the Secretary of War and the supervision of the Chief of Engineers, for the construction, completion, repair, and preservation of the public works hereinafter named:

* * * * * * *

Improving Mississippi River, from Head of Passes to the mouth of the Ohio River, including salaries, clerical, office, traveling, and miscellaneous expenses of the Mississippi River Commission: Continuing improvement, with a view to securing a permanent channel depth of nine feet and to the completion of said improvement within a period of twenty years, two million dollars, which sum shall be expended under the direction of the Secretary of War in accordance with the plans, specifications, and recommendations of the Mississippi River Commission, as approved by the Chief of Engineers, for the general improvement of the river, for the building of levees between the Head of Passes and Cape Girardeau, Missouri, and for surveys, including the survey from the Head of Passes to the headwaters of the river, in such manner as in their opinion shall best improve navigation and promote the interests of commerce at all stages of the river: *Provided*, That from and after the date of the approval of this Act the member of said commission appointed from the Coast and Geodetic Survey shall receive the same annual compensation as other civilian members of said commission, and the excess of said compensation over and above the compensation he receives from the Coast and Geodetic Survey shall be paid from the funds of said commission: *Provided further*, That of the money hereby appropriated so much as may be necessary shall be expended in the construction of suitable and necessary dredge boats and other devices and appliances and in the maintenance and operation of the same: *Provided further*, That the water courses connected with said river, and the harbors upon it, now under the control of the Mississippi River Commission and under improvement, may, in the discretion of said commission, upon approval by the Chief of Engineers, receive allotments for improvements now underway or hereafter to be undertaken, to be paid for from the amounts herein appropriated: *And provided further*, That of the amount herein appropriated so much thereof as may be necessary shall be

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used in making an examination and report upon the necessity, urgency, and practicability of permanently separating the waters of the Red and Atchafalaya rivers from those of the Mississippi River, together with an estimate of the cost of such work. The said commission shall prepare a statement as to the localities and quantities of revetment required for the complete treatment of the said river below Cairo and an estimate of the cost thereof, and report the same to Congress. The said commission shall also prepare and report to Congress a statement of the amounts expended by the United States Government in the construction of levees as well as a statement of the amounts expended by States, levee districts, and communities interested. The said commission shall also report to Congress a statement of the quantity of land which will be reclaimed or protected by revetment or other work done by the United States exclusively.

* * * * * * *

For the construction of a waterway from Lockport, Illinois, by way of the Desplaines and Illinois rivers to the mouth of said Illinois River, one million dollars. The Secretary of War shall appoint a board of five members, to be composed of four engineer officers of the army and one civil engineer taken from civil life. The president of the board of five members authorized under Act of March second, nineteen hundred and seven, to examine the Mississippi River below Saint Louis and report to Congress on the project of a fourteen-foot channel, shall be a member of and president of the board herein provided for. Said board shall report upon the feasibility of such waterway, and the most advisable depth and dimensions therefor, in case the same is recommended; also upon such measures as may be required to properly preserve the levels of the Great Lakes and to compensate, so far as practicable, for the diminished level in said lakes and the connecting waters thereof by reason of any diversion of water from Lake Michigan for the maintenance of the proposed waterway herein described, or diversion for any other purpose; and further, also, upon the influence on volume and height of waters in the Mississippi River below Cairo; and further, also, as to the effect upon the climate of the Lake States by a change in the natural currents of Lake Michigan. The board shall, after full conference with the authorized agency of the State of Illinois, submit a report upon the extent to which the United States may properly cooperate with the State of Illinois in securing the construction of a navigable waterway from Lockport to the mouth of the Illinois River in conjunction with the development of water power by said State between Lockport and Utica, for which the people of the State of Illinois have authorized their general assembly to appropriate twenty million dollars; the report shall state the extent and character of the cooperation recommended and the conditions considered necessary in connection therewith to fully protect the interests of the United States. Should the board consider cooperation to be advisable, the report herein called for shall include plans and estimates of cost of the work recommended to be done by the United States alone or in cooperation with the State of Illinois; and until these plans and estimates have been submitted and a project for the improvement adopted by Congress the appropriation of one million dollars herein made shall not be available for expenditure. The board also shall consider and report upon the improvement of the Mississippi between the mouth of the Illinois River and the mouth of the Ohio River by the construction of a dam at or near Jefferson Barracks and a dam at or near Commerce, and the development of water power incidentally created by such dams. In the performance of its duties the board may consider all reports heretofore made; and the force, plant, and records of the Mississippi River Commission and the several engineer districts between Chicago and Cairo shall be available for the use of the board. The members of the board herein authorized shall be entitled to compensation at the rate of six thousand dollars per annum, but the official salary of any officer appointed on said board from the Engineer Corps of the Army shall be deducted from the compensation provided for in this Act. For salaries and expenses of said board, including all necessary clerical and other personal services, there is hereby appropriated the sum of fifty thousand dollars. The reports herein called for shall be submitted to the Chief of Engineers not later than November first, nineteen hundred and ten, reviewed by the Board of Engineers for Rivers and Harbors, and submitted to Congress not later than the first Monday in December, nineteen hundred and ten.

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In the collection of statistics relating to traffic, the Corps of Engineers is directed to adopt a uniform system of classification for freight, and upon rivers or inland waterways to collate ton-mileage statistics as far as practicable.

* * * * * * *

The surveys of navigable streams herein or hereafter authorized shall include such stream-flow measurements and other investigations of the watersheds as may be necessary for preparation of plans of improvement and a proper consideration of all uses of the stream affecting navigation, and whenever necessary similar investigations may be made in connection with all navigable streams under improvement.

* * * * * * *

Approved, June 25, 1910.

APPENDIX 2.

REPORT OF MAJ. M. L. WALKER, CORPS OF ENGINEERS, ON OPERATIONS IN THE FIRST AND SECOND DISTRICTS.

UNITED STATES ENGINEER OFFICE,
Memphis, Tenn., June 1, 1910.

COLONEL: I have the honor to submit the following report of operations in the first and second districts, Mississippi River improvement, for the year ending May 31, 1910.

The first district extends from Cape Girardeau, Mo., to the foot of Island 40, a distance of 270 miles. Operations in this district include bank protection work at Columbus and Hickman, Ky., and at New Madrid and Caruthersville, Mo.; systematic improvement of Plum Point reach, Tennessee and Arkansas, abattis dike work, levee work in the upper St. Francis and Reelfoot levee districts, and in the lower St. Francis levee district to milepost 139–140.

The second district extends from the foot of Island 40 to the mouth of White River (393 R.), a distance of 173 miles, excepting on the left bank where it ends at the Coahoma-Bolivar county line (365 L.). Operations in this district include revetment work at Memphis, Tenn., Hopefield Bend and Helena, Ark.; the improvement of Wolf River, Tennessee; bank protection in Walnut Bend, Arkansas, and in Old Town Bend, Arkansas; levee work in the White River and the upper Yazoo levee districts, and in the lower St. Francis levee district south of milepost 139–140.

PART I.—CHANNEL WORK.

This work has been under the charge of Assistant Engineers August J. Nolty and M. Gardner, and Junior Engineers D. M. Brock and Arther Barrett. This report is compiled from data furnished by them.

FIRST DISTRICT (CAPE GIRARDEAU, MO., TO FOOT OF ISLAND 40—270 MILES).

Columbus, Ky. (21 L.).—(For description and previous history, see the current annual report of the Mississippi River Commission and p. 3580, Report Chief of Engineers, 1891. For last map, see map No. 1, Appendix 2, Report Chief of Engineers, 1905, Supplement.) Special appropriation.

Hickman, Ky. (36 L.).—(For references to previous history, see the current annual report of the Mississippi River Commission and p. 152, Report Chief of Engineers, 1905, Supplement. For last map, see map No. 2, Report Chief of Engineers, 1905, Supplement, Appendix 2.) Special appropriation.

New Madrid, Mo. (71 R.).—(For references to previous history, see the current annual report of the Mississippi River Commission and p. 152, Report Chief of Engineers, 1905, Supplement.) Special appropriation.

Caruthersville, Mo. (110 R.).—(For references to previous history, see p. 2730, Report Chief of Engineers, Part 3, 1909.) There is no immediate necessity for any work here, but in order to hold intact the existing revetment it is very likely that within a year or two extensions will have to be added above and below in order to protect the existing work against erosion.

Chute of Island 26 (150 L.).—(For references to previous history, see p. 2730, Report Chief of Engineers, Part 3, 1909.) On account of more urgent work elsewhere and shortage of plant it was impossible to undertake the contemplated closure of this chute. The enlargement of the chute continued rapidly, and by the opening of the 1909 season it was practically the main river,

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and its closure was abandoned. The balance of $13,914.41 to the credit of this work was transferred to the allotment for Hopefield Bend. Map No. 5 accompanying this report shows the present condition of the chute.

PLUM POINT REACH (147 TO 186 MILES BELOW CAIRO).

(For reference to previous history, see Report Chief of Engineers, 1909, Part 3, p. 2730; for statement regarding existing works and their effect upon the river channels, see current annual report of the Mississippi River Commission.) Map No. 5, forwarded herewith, shows the present conditions.

The works of improvement in this reach extend from above Daniels Point to near Craighead Point, Arkansas, a distance of about 17 miles (151–168). These operations were begun in 1882 and have been fully described in subsequent reports. In general terms, the work done has been the closure of Osceola and Bullerton chutes by pile dikes; the partial closure of Gold Dust Chute by pile dikes and a brush and stone dam; the contraction of the low-water channel by dikes at Ashport bar, Elmot bar, and Plum Point; the revetment of caving banks above Daniels Point, throughout Ashport and Fletchers bends, along a part of the fronts of Osceola and Bullerton bars at Plum Point and near Craighead Point, and the construction of levees along both banks of the river.

Details of the work are as follows:

Daniels Point, Arkansas (152 R.).—(For description and previous history, see Report Chief of Engineers, 1905, Supplement, p. 153, and Report for 1909, Part 3, p. 2731.) There are strong indications that before the close of the year the main channel will have shifted from O'Donnells Bend to the chute of Island 26. (See map No. 5 herewith.)

Ashport Bend, Tennessee (155 L.).—(For references to previous history, see Report Chief of Engineers, 1905, Supplement, p. 153, and Report for 1909, Part 3, p. 2731.) The lower end of this revetment has suffered some damage due to the upstream travel of the erosion below the work. Some repairs should be made here to check further damage. The upper half of this revetment is completely silted up by accretions to the main shore. (See map No. 5 herewith.)

Fletchers Bend, Arkansas (158–161 R.).—(For references to previous history, see Report Chief of Engineers, 1905, Supplement, p. 153, and subsequent reports.) The work done in this locality during the past season was as follows: The mattress plant was moved from Osceola front to Wolverton Landing on September 20, 1909. One small connecting mat was placed just above the Wolverton eddy and two small connecting mats were placed around the point just below the eddy in order to give connections for making repairs to the pavement along last season's work. Two crib dikes were placed on top of the bank at the point below the eddy, to prevent surface scour during high water, and one crib dike was placed behind the abattis dike in the eddy. One channel mattress 250 feet wide, with three small connecting mats, was placed below the Wolverton eddy at the lower end of last season's work, extending 431 feet downstream, and the bank graded and paved with standard paving to a height corresponding to about 25 feet on the Fulton gauge. Seven hundred and sixty-four feet of bank alongside of last season's work was graded and paved to a height corresponding to 25 feet on the Fulton gauge. The mat plant was moved from Fletchers Bend to Hopefield Bend on October 19, and a small outfit was left to complete the grading and paving. An examination made in March, 1909, showed some damage to the work of last season just below the Wolverton eddy. The extent of the damage could not be ascertained, but it is not believed to be serious. Being on a somewhat salient point, it should be repaired this season. Map No. 6 accompanying this report shows the location and extent of the work. The amount of work done, its cost, and the material used are as follows:

Channel mattress No. 12 (431 feet by 250 feet, equaling 1,077.5 squares):	
Strand, ½-inch, 208 pounds	$6.55
Strand, ⅝-inch, 1,273 pounds	49.01
Strand, ⅞-inch, 1,620 pounds	50.54
Strand, 1-inch, 5,200 pounds	163.80
Wire, No. 12, 2,768 pounds	68.09
Wire, silicon bronze, 394 pounds	108.35
Staples, 100 pounds	3.50
Clips, ½-inch, 172	8.17
Clips, ⅝-inch, 148	10.80
Clips, ⅞-inch, 498	39.34
Clips, 1-inch, 323	27.42

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Channel mattress No. 12, etc.—Continued.	
Miscellaneous material	$100.00
Brush and poles, 1,534.9 cords	2,379.10
Stone, 820 cubic yards	1,528.90
Steamboat expense	1,329.38
Labor, subsistence, and supervision	4,169.25
	10,042.20
Cost per linear foot, $23.80.	
Cost per square, $9.32.	
Cords of brush and poles per linear foot, 3.56.	
Cords of brush and poles per square, 1.42.	
Cubic yards of stone per linear foot, 1.90.	
Cubic yards of stone per square, 0.761.	
Cubic yards of stone per cord of brush and poles, 0.534.	
Connecting mattresses 1, 2, 3, 4, 5, and 6 (295.25 squares):	
Strand, ⅞-inch, 600 pounds	18.72
Strand, ½-inch, 1,600 pounds	50.40
Wire, No. 12, 825 pounds	21.90
Staples, 100 pounds	3.50
Clips, ½-inch, 69	3.28
Clips, ⅞-inch, 278	23.58
Miscellaneous material	82.33
Brush and poles, 419.8 cords	650.69
Stone, 310 cubic yards	579.00
Steamboat expense	385.80
Labor, subsistence, and supervision	1,445.01
	3,214.21
Cost per square, $10.89.	
Cords of brush and poles used per square, 1.42.	
Cubic yards of stone used per square, 1.05.	
Cubic yards of stone used per cord of brush and poles, 0.739.	
Crib dikes Nos. 1, 2, and 3: 110 feet by 12 feet by 4 feet, equaling 5,280 cubic feet; 100 feet by 16 feet by 5 feet, equaling 8,000 cubic feet; 60 feet by 24 feet by 2 feet, equaling 2,880 cubic feet:	
Wire, No. 12, 345 pounds	7.59
Brush and poles, 125 cords	193.75
Stone, 225 cubic yards	419.54
Steamboat expense	75.00
Labor, subsistence, and supervision	744.36
	1,440.24
Cost per cubic foot, $0.089.	
Grading bank (1,195[a] linear feet, equaling 15,070 cubic yards):	
Coal, etc	147.00
Labor, subsistence, and supervision	1,165.84
	1,312.84
Cost per linear foot, $1.098.	
Cost per cubic yard, $0.087.	
Paving bank (1,195[a] linear feet, equaling 9,341 square yards):	
Stone, 2,780 cubic yards	5,183.35
Steamboat expense	500.00
Labor, subsistence, and supervision	4,172.48
	9,855.83
Cost per linear foot, $8.25.	
Cost per square yard, $1.055.	
Cubic yards of stone used per square yard, .298.	
Total field cost (Fletchers Bend)	25,865.82

[a] 764 linear feet of this is along last season's work.

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Cost of protection per linear foot can not be given in this instance, since the new work and repairs are too intimately associated for their costs to be separated.

Osceola front, formerly Osceola bars (164 R.).—(For reference to previous history, see Reports Chief of Engineers, 1907, p. 2678; 1908, Part 3, p. 2719; and 1909, Part 3, p. 2734). The mattress plant was moved from the Memphis Fleet to Osceola front, August 15, 1909. One channel mattress, 250 feet wide, was placed at the head of last season's work, extending upstream for a distance of 810 feet, and the bank graded to the top and paved with standard paving on spall foundation to a height corresponding to 30 feet on the Fulton gauge. The mattress plant was moved from Osceola front to Fletchers Bend on September 20, 1909, and a small outfit was left to complete the grading and paving. Unless unexpected caving takes place above or below the existing revetment, no work will be necessary this season.

Map No. 7, accompanying this report, shows the location and extent of the work. The amount of work done, its cost, and the material used is as follows:

Channel mattress No. 4 (810 feet by 250 feet, equaling 2,025 squares):	
Strand, ½-inch, 18,441 pounds	$423.89
Strand, ⅜-inch, 1,530 pounds	58.91
Strand, 5/16-inch, 3,374 pounds	105.27
Strand, ¼-inch, 10,199 pounds	298.82
Wire, No. 12, 6,430 pounds	166.20
Wire, silicon bronze, 608 pounds	167.20
Staples, 400 pounds	9.35
Clips, ½-inch, 815	38.71
Clips, ⅜-inch, 176	12.57
Clips, 5/16-inch, 926	73.15
Clips, ¼-inch, 323	27.43
Miscellaneous material	125.00
Brush and poles, 2,836 cords	4,395.80
Stone, 1,527.3 cubic yards	2,847.67
Steamboat expense	2,550.00
Labor, subsistence, and supervision	8,754.94
	20,054.41

Cost per linear foot, $24.76.
Cost per square, $9.90.
Cords of brush and poles per linear foot, 3.50.
Cords of brush and poles per square, 1.40.
Cubic yards of stone per linear foot, 1.88.
Cubic yards of stone per square, 0.754.
Cubic yards of stone per cord of brush and poles, .539.

Grading bank (795 linear feet, equaling 7,500 cubic yards):	
Coal, etc	94.50
Labor, subsistence, and supervision	607.72
	702.22

Cost per linear foot, $0.883.
Cost per cubic yard, $0.094.

Paving bank (810 linear feet, equaling 7,209 square yards):	
Stone, 2,159.7 cubic yards	4,026.78
Steamboat expense	400.00
Labor, subsistence, and supervision	3,252.42
	7,679.20

Cost per linear foot, $9.48.
Cost per square yard, $1.065.
Cubic yards of stone used per square yard, 0.300.

Total field cost (Osceola front)	28,435.88
Total field cost per linear foot of bank protected	35.10

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Summary showing the total cost of work in Plum Point reach:

Total field cost	$54,301.15
Office expense	1,122.24
Surveys	1,804.99
Rent of plant	2,405.09
Care of plant	2,276.87
Repairs to plant	9,342.70
Depreciation of plant	8,789.60
Total cost	80,042.64

Bullerton Tow Head (168 R.).—(For description and previous history and references thereto, see Report Chief Engineers, 1905, Supplement, p. 153.) For location and extent of the work, see map No. 5 accompanying this report. The revetment remains in good condition and no work will be required here this season.

SECOND DISTRICT (FOOT OF ISLAND 40 TO WHITE RIVER, 173 MILES).

Hopefield Bend (227–230 R.).—(For description and previous history and references thereto, see Reports Chief of Engineers, 1907, p. 2678; 1908, p. 2719; and 1909, p. 2737. For last map, see Report Chief of Engineers, 1909.) Map No. 9, forwarded herewith, shows condition prior to the cave of April 10 of the current year. The work done here during the past season consisted of repairs to existing work. The mattress plant arrived at Hopefield Bend on October 20, 1909. Channel mattress No. 2, 140 feet wide, was placed beginning at range station 32+25 and extending downstream 558 feet to the upper point of the upper existing pocket. No grading or paving alongside of this mattress was necessary. Channel mattress No. 1, with the necessary connecting mats, was placed, beginning at range station 41+40 east and extending downstream 1,687 feet. The grading and paving alongside of this mattress was not continuous throughout the length, only 1,220 feet being graded and 1,040 feet being paved. One connecting mattress was placed from range station 18 to 20 east, where indications of a break in the old mattress was shown at low water. Also a small connecting mattress was placed between range station 59 and 60 east for making repairs to paving at that point. Two small pocket mats were placed for protecting the upper and lower points in the big pocket, which extends from about range station 37+50 to 41 east. Paving was completed on February 26, 1910, and the plant was moved to the Memphis fleet. The work at Hopefield Bend was greatly delayed by four separate runs of heavy ice during the months of December and January, it being necessary to move the plant to a safe ice harbor at Mound City ferry landing each time. The cost of the work is given in detail, as follows:

Channel mattress No. 1 (1,687 by 140 feet, equaling 2,361.8 squares):

Strand, ½-inch, 2,021 pounds	$63.66
Strand, ⅜-inch, 1,968 pounds	75.77
Strand, 7/16-inch, 4,870 pounds	131.87
Strand, ¼-inch, 11,120 pounds	305.80
Wire, No. 12, 5,364 pounds	126.80
Wire, silicon bronze, 668 pounds	183.70
Staples, 500 pounds	9.75
Clips, ½-inch, 203	9.14
Clips, ⅜-inch, 727	51.91
Clips, 7/16-inch, 921	68.87
Miscellaneous material	100.00
Brush and poles, 3,087.1 cords	4,785.00
Stone, 1,425 cubic yards	2,666.95
Steamboat expense	1,425.00
Labor, subsistence, and supervision	7,904.71
	17,908.93

Cost per linear foot, $10.62.
Cost per square, $7.58.
Cords of brush and poles per linear foot, 1.83.
Cords of brush and poles per square, 1.31.
Cubic yards of stone per linear foot, 0.845.
Cubic yards of stone per square, 0.603.
Cubic yards of stone per cord of brush and poles, 0.461.

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Channel mattress, No. 2 (558 by 140 feet, equaling 781.2 squares):	
Strand, ½-inch, 3,159 pounds	$93.64
Strand, ⅝-inch, 1,600 pounds	40.64
Strand, ¾-inch, 4,184 pounds	115.06
Wire, No. 12, 2,350 pounds	51.70
Wire, silicon bronze, 252 pounds	69.30
Staples, 200 pounds	3.90
Clips, ½-inch, 155	6.98
Clips, ⅝-inch, 383	27.58
Miscellaneous material	45.00
Brush and poles, 991.8 cords	1,537.29
Stone, 480 cubic yards	894.95
Steamboat expense	450.00
Labor, subsistence, and supervision	2,522.71
	5,858.75
Cost per linear foot, $10.50.	
Cost per square, $7.50.	
Cords of brush and poles per linear foot, 1.78.	
Cords of brush and poles per square, 1.27.	
Cubic yards of stone per linear foot, 0.860.	
Cubic yards of stone per square, 0.614.	
Cubic yards of stone per cord of brush and poles, 0.484.	
Connecting mattresses Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 (1,090.14 squares):	
Strand, ½-inch, 559 pounds	15.88
Strand, ⅝-inch, 2,376 pounds	60.35
Strand, ¾-inch, 5,776 pounds	158.84
Wire, No. 12, 3,080 pounds	67.75
Staples, 300 pounds	5.85
Clips, ½-inch, 222	9.99
Clips, ⅝-inch, 700	50.40
Miscellaneous material	49.68
Brush and poles, 1,436 cords	2,225.80
Stone, 875 cubic yards	1,631.45
Steamboat expense	690.80
Labor, subsistence, and supervision	5,339.44
	10,306.23
Cost per square, $9.45.	
Cords of brush and poles per square, 1.32.	
Cubic yards of stone per square, 0.803.	
Cubic yards of stone per cord of brush and poles, 0.609.	
Grading bank (1,220 linear feet, equaling 9,703 cubic yards):	
Coal, etc	136.50
Labor, subsistence, and supervision	784.39
	920.89
Cost per linear foot, $0.755.	
Cost per cubic yard, $0.095.	
Paving bank (1,040 linear feet, equaling 5,128[c] square yards):	
Stone, 1,361 cubic yards	2,537.60
Material for reinforced concrete paving	291.46
Labor, subsistence, and supervision	3,261.41
	6,090.47
Cost per linear foot, $5.86.	
Cost per square yard, $1.187.	
Cubic yards of stone used per square yard of stone paving, 0.33.	

[c] Of this amount 1,010 square yards is experimental reinforced concrete paving.

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Total field cost	$41,085.27
Office expenses	1,832.08
Surveys	484.96
Rent of plant	693.80
Care of plant	1,782.52
Repairs to plant	7,051.60
Depreciation of plant	6,662.60
Total cost	59,092.83

Cost of protection per linear foot in this case can not be given, owing to irregularity of the work and great amount of repairs.

Value of material on hand at the close of the season's work, to the credit of Hopefield Bend:

Stone	$1,662.91

In addition to the above costs, Hopefield Bend paid for a barge of stone, containing 362.5 cubic yards and valued at $625.42, which was sunk and lost June 25, 1909.

Wolf River (230 L.).—(For references to previous history, see p. 154, Report Chief of Engineers, 1905, Supplement, and Report for 1908, Part 3, p. 2723. Special appropriation.) No allotment was made for this work, and hence no work was done. During low-water periods navigation on Wolf River is suspended.

Commercial statistics of Wolf River.

Number of lumber-manufacturing plants	5
Capital invested	$1,893,614
Value of finished product	$1,845,811
Amount paid in wages	$506,606
Timber sawed, feet B. M	52,164,295
Value in logs at mill	$458,269
Towing plant employed:	
Steamboats (4), value	$52,000
Derrick boats (4), value	$21,000
Barges (14)	$52,000

Memphis Harbor, Tenn. (230–232 L.).—(For references to description and previous history and present condition, see the current annual report of the Mississippi River Commission and p. 155, Report Chief of Engineers, 1905, Supplement.) See map No. 9 herewith.

Walnut Bend, Ark. (231 R.).—(For reference to previous history and works, see current annual report of the Mississippi River Commission and Reports Chief of Engineers, 1908, Part 3, p. 2724, and 1909, Part 3, p. 2739.) For map showing the general conditions of the work done this year, see map No. 12 herewith. At the end of last season's work there was about 4,200 linear feet of revetment in place. The project for the season's work contemplated extending the revetment upstream as far as the funds would permit. Before work was begun quite a serious break occurred in the revetment placed during the season of 1907–8, so the project was modified, in order to repair this break. The plant reached Walnut Bend December 5, and work was begun at once. To repair the break it was found necessary to build two large pocket or connecting mats in the pocket and a channel mat 120 feet wide across the chord of the pocket. The work was prosecuted as fast as possible, but operations were seriously handicapped by four runs of very heavy ice, during which but little work could be done. The season's work was finally completed on January 21 and the plant towed to Memphis.

The season's work resulted in no extensions of the revetment either up or down stream. Since the end of the season's work another break has occurred in the revetment at range 15. This break is about 400 feet long and extends back to within about 50 feet of the toe of the levee. In order to complete the revetment in this bend the break referred to should be repaired and the revetment carried upstream from the upper end of the present work to the mouth of Old River, a distance of about 2,500 feet, and downstream from the lower end of the present work about 800 feet.

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The following is a table of costs:

Channel mattress No. 6 (391 feet by 125 feet, equaling 489 squares):	
Strand, ½-inch, 3,399 pounds	$96.19
Strand, ⅜-inch, 1,138 pounds	28.90
Strand, ¼-inch, 4,867 pounds	133.84
Wire, No. 12, 1,701 pounds	37.42
Wire, silicon bronze, 110 pounds	21.01
Staples, 200 pounds	3.90
Clips, ½-inch, 190	4.77
Clips, ⅜-inch, 188	2.37
Miscellaneous material	78.50
Brush and poles, 612 cords	887.40
Stone, 367 cubic yards	633.19
Steamboat expense	428.94
Labor, subsistence, and supervision	5,436.18
	7,792.61

Cost per linear foot, $19.93.
Cost per square, $15.94.
Cords of brush and poles per linear foot, 1.57.
Cords of brush and poles per square, 1.25.
Cubic yards of stone per linear foot, 0.94.
Cubic yards of stone per square, 0.71.
Cubic yards of stone per cord of brush and poles, 0.60.

Connecting mattresses Nos. 15 and 16 (869 squares):	
Strand, ½-inch, 470 pounds	13.30
Strand, ⅜-inch, 2,862 pounds	72.69
Strand, ¼-inch, 6,165 pounds	169.54
Wire, No. 12, 2,127 pounds	46.79
Staples, 200 pounds	3.90
Clips, ½-inch, 31	.78
Clips, ⅜-inch, 170	2.14
Miscellaneous material	157.00
Brush and poles, 1,190 cords	1,725.50
Stone, 615 cubic yards	1,061.06
Steamboat expense	405.11
Labor, subsistence, and supervision	7,270.18
	10,927.99

Cost per square, $12.58.
Cords of brush and poles per square, 1.37.
Cubic yards of stone per square, 0.71.
Cubic yards of stone per cord of brush and poles, 0.52.

Grading bank (374 feet by 54 feet, equaling 5,196 cubic yards):	
Coal	93.15
Labor, subsistence, supervision, etc	425.94
	519.09

Cost per linear foot, $1.388.
Cost per cubic yard, $0.10.

Paving (8,812 square yards):	
Stone and spalls, 2,065 cubic yards	4,274.04
Labor, subsistence, and supervision	2,620.50
	6,894.54

Cost per square yard, $0.782.
Cubic yards of stone per square yard, 0.23.

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Total field cost	$26,134.23
Office expenses	209.43
Surveys	468.88
Rent of plant	2,116.22
Repairs to plant	4,496.50
Depreciation	4,238.10
Care of plant (includes $1,273.34 of rope)	2,056.84
Total cost	39,720.20

Total unit cost:
Grading, per cubic yard, $0.15.
Paving, per square yard, $1.19.
Channel mattress per square, $24.21.
Connecting mattress per square, $19.11.

All repair work, and hence the cost of revetment per linear foot can not be stated.

Value of material on hand at the close of the season:
Stone, 7,234.05 cubic yards, at $1.306 ..... $9,447.03

Helena, Ark. (306 R.).—(For references to previous history, see current annual report of the Mississippi River Commission and Reports of Chief of Engineers, 1905, Supplement, p. 155, and 1909, p. 2742.) Map No. 13, forwarded herewith, shows present condition. With the exception of a small sink in the revetment about 500 feet below the elevator, the work is in good condition. If necessary the fault will be repaired this season.

Old Town Bend, Ark. (324 R.).—(For references and previous history and works, see the current annual report of the Mississippi River Commission, and Reports of Chief of Engineers, 1908, Part 3, p. 2728, and 1909, Part 3, p. 2743.) Map No. 14, herewith, shows present conditions. At the end of last season's work there was 4,855 linear feet of revetment in place, and this season's project contemplated the extension of the revetment downstream about 2,500 feet. The plant with which this work was done left Memphis August 17, and arrived at Old Town Bend late the same day. The first work done was the unloading of stone in order to get enough empty barges for the brush service. Mat building was begun on August 30 and prosecuted as rapidly as possible. This work was attended by no unusual difficulties, and it progressed as fast as could be expected, considering the excessive heat and the poor class of labor obtainable during the early part of the season.

Channel mat No. 7 was completed and sunk on October 1. It is 1,078 feet long by 254 feet wide. Three connecting mats were then built and were all sunk by the 11th. Channel mat No. 8 was begun on October 12 and was completed and sunk on November 14. It is 1,354 feet long by 254 feet wide. Upon the completion of this mattress five connecting mats were built and sunk. The operations at this point were completed December 3.

Grading and paving were carried on simultaneously with mat building. The paving was carried up to only about the 20-foot stage on the Helena gauge, as there was no more stone on hand and as it was desirable to begin work at Walnut Bend as soon as possible to prevent further damage at that place.

The result of the season's work was the extension of the revetment 2,400 feet downstream. In order to finally complete the revetment of this bend the work should be extended downstream about 1,400 feet and the paving of the past two seasons' work should be carried up to near the top bank.

The following is a table of costs:

Channel mattress No. 7 (1,078 feet long by 254 feet wide, equaling 2,738 squares):	
Strand, ½-inch, 11,870 pounds	$322.91
Strand, ⅜-inch, 835 pounds	32.15
Strand, 7/16-inch, 6,053 pounds	153.75
Strand, ¼-inch, 22,548 pounds	710.68
Wire No. 12, 5,793 pounds	127.45
Wire, silicon bronze, 1,623 pounds	446.33
Staples, 600 pounds	15.00

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Channel mattress No. 7, etc.—Continued.

Clips, ½-inch, 1,016	$45.72
Clips, ⅜-inch, 189	13.49
Clips, ⅞-inch, 1,253	15.79
Miscellaneous material	248.00
Brush and poles, 4,742 cords	6,875.90
Stone, 1,513.7 cubic yards	2,623.49
Steamboat expense	1,972.35
Labor, subsistence, and supervision	12,133.35
	24,836.36

Cost per linear foot, $23.04.
Cost per square, $9.07.
Cords of brush and poles per linear foot, 4.39.
Cords of brush and poles per square, 1.73.
Cubic yards of stone per linear foot, 1.41.
Cubic yards of stone per square, 0.55.
Cubic yards of stone per cord of brush and poles, 0.32.

Channel mattress No. 8 (1,354 feet long by 254 feet wide, equaling 3,439 squares):

Strand, ½-inch, 15,786 pounds	447.77
Strand, ⅞-inch, 7,139 pounds	181.33
Strand, ½-inch, 27,672 pounds	760.98
Wire, No. 12, 7,853 pounds	190.27
Wire, silicon bronze, 1,665 pounds	178.90
Staples, 640 pounds	16.00
Clips, ½-inch, 1,380	47.53
Clips, ⅞-inch, 1,554	19.58
Miscellaneous material	260.74
Brush and poles, 4,549 cords	6,596.05
Stone, 1,814.4 cubic yards	3,219.29
Steamboat expense	1,143.84
Labor, subsistence, and supervision	13,630.44
	26,692.72

Cost per linear foot, $19.71.
Cost per square, $7.76.
Cords of brush and poles per linear foot, 3.36.
Cords of brush and poles per square, 1.32.
Cubic yards of stone per linear foot, 1.34.
Cubic yards of stone per square, 0.53.
Cubic yards of stone per cord of brush and poles, 0.40.

Connecting mattresses Nos. 19, 20, and 21 (341 squares):

Strand, ½-inch, 254 pounds	7.19
Strand, ⅞-inch, 1,383 pounds	35.13
Strand, ½-inch, 2,317 pounds	63.72
Wire No. 12, 824 pounds	18.13
Staples, 60 pounds	1.50
Clips, ½-inch, 22	.55
Clips, ⅞-inch, 337	4.25
Miscellaneous material	31.00
Brush and poles, 590 cords	855.50
Stone, 400 cubic yards	709.72
Steamboat expense	262.13
Labor, subsistence, and supervision	1,690.85
	3,679.17

Cost per square, $10.79.
Cords of brush and poles per square, 1.73.
Cubic yards of stone per square, 1.17.
Cubic yards of stone per cord of brush and poles, 0.68.

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Connecting mattresses Nos. 22, 23, 24, 25, and 26 (878 squares):	
Strand, $\frac{5}{16}$-inch, 2,833 pounds	$71.96
Strand, $\frac{1}{4}$-inch, 6,116 pounds	168.19
Wire No. 12, 2,780 pounds	66.33
Staples, 200 pounds	5.00
Clips, $\frac{1}{4}$-inch, 31	.78
Clips, $\frac{5}{16}$-inch, 590	7.43
Miscellaneous material	62.00
Brush and poles, 1,078 cords	1,563.10
Stone, 526.8 cubic yards	934.70
Steamboat expense	381.28
Labor, subsistence, and supervision	4,265.70
	7,526.47
Cost per square, $8.57.	
Cords of brush and poles per square, 1.23.	
Cubic yards of stone per square, 0.60.	
Cubic yards of stone per cord of brush and poles, 0.49.	
Grading bank (2,719 feet by 92 feet, equaling 85,318 cubic yards):	
Coal	737.87
Labor, subsistence, supervision, etc	2,725.75
	3,463.62
Cost per linear foot, $1.274.	
Cost per cubic yard, $0.0406.	
Paving (2,719 feet by 20 feet, equaling 6,063 square yards):	
Stone and spalls, 2,928.4	5,195.86
Labor, subsistence, and supervision	1,910.80
	7,106.66
Cost per square yard, $1.177.	
Cost per linear foot, $2.61.	
Cubic yard of stone per square yard, 0.48.	
Total field cost	73,305.00
Office expenses	1,821.08
Surveys	605.14
Rent of plant	2,363.89
Repairs to plant	12,612.40
Depreciation	11,887.60
Care of plant	2,214.20
	104,809.31
Total unit cost:	
Grading, per linear foot	2.17
Paving, per linear foot	3.73
Channel mattress, per linear foot	31.10
Connecting mattress, per linear foot	6.66
Total cost per linear foot of bank protected	43.66
Field cost per linear foot of bank protected	30.54

PLANT.

The floating plant has been decreased during the year by the sinking of two material barges and by the loss of three skiffs. One motor boat has been added. The steamer *Minnetonka* will be docked for extensive repairs, proposals for this work having been sent to various shipyards, the United States dock being too small to handle this boat. Repairs have been made to the United States floating dock. The dredge *Wolf* and the two dump scows are in very bad condition. The dredge will be repaired and the dump scows offered for condemnation.

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NEW PLANT.

Inspecting and towing to Memphis of three contract barges	$973.53
Motor boat *Titania*	810.07
Tools, appliances, and outfit	2,689.99
Compensation for injuries received on the work [a]	1,108.80
Total	5,582.39

Description and cost of repairs to plant.

Steamer *Minnetonka:* Repairs to hull, machinery, boilers, wheel, rudders, and painting	$1,733.13
Steamer *Chisca:* Repairs to hull, machinery, boilers, wheel, cabin, guards, etc	1,885.40
Steamer *Titan:* Repairs to wheel, boilers, machinery, cabin, etc.; docked, and hull rebuilt	9,487.17
Steamer *Graham:* Repairs to hull, machinery, cabin, capstans, wheel, etc	648.45
Steamer *Itasca:* New cylinder frames, wheel flanges, and wheel; boilers and pipes covered with magnesia covering, and boat painted	985.40
Steamer *W. M. Rees:* Old boiler taken out and new one installed. new boiler casing, furnace and furnace liners installed; boilers and pipes covered with magnesia covering; cabin repaired; roof recovered and boat painted	935.42
Steam tender *No. 8:* Docked, hull scraped and painted; rudders, machinery, and cabin repaired	725.25
Hydraulic grader *No. 2:* Decks and sides repaired and calked, machinery and boilers repaired	687.46
Hydraulic grader *No. 9313:* Docked, received new rakes and bottom plankshear, decks repaired; boat calked all over; machinery overhauled, repaired, and packed	1,883.19
Pile driver *No. 6:* Machinery overhauled at various times	189.95
Pile driver *No. 9:* Machinery overhauled at various times	196.42
Derrick boat *No. 3:* Machinery and stiff legs repaired; hull calked, etc	258.54
Derrick boat *No. 2:* Machinery repaired, hull calked, etc	190.50
Store boat *No. 8:* Minor repairs and calking	50.50
Quarter boat *No. 11:* Minor repairs to hull and cabin	68.00
Quarter boat *No. 12:* Minor repairs to hull and cabin; thoroughly screened	185.75
Quarter boat *No. 27:* Received repairs to hull and cabin, and was wired for electric lights	355.00
Quarter boat *No. 29 (Amelia):* Docked; repairs to bottom rakes and sides; new tin roof, and repairs to cabin, etc	1,169.80
Quarter boat *No. 2:* Roof patched, renailed, and painted; cabin painted; docked, and new bottom and rakes put in; sides repaired; hull thoroughly calked	1,748.56
Quarter boat *No. 3:* Docked; extensive repairs to bottom; rakes renewed; cabin repaired and painted	1,408.23
Quarter boat *No. 206:* Received new timber heads and minor repairs to hull and cabin, cabin painted, electric generator and engine installed, boat wired	985.46
Quarter boat *No. 221:* Received minor repairs to hull and cabin, hull calked afloat, electric generator and engine installed and boat wired, cabin painted	1,003.87
Machine-shop boat *No. 2:* Received new stack, machinery overhauled, shafting lined up, boiler repaired; also received general repairs to machinery throughout the season; hull calked afloat	655.85

[a] This is an old claim dating back to 1908.

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Carpenter-shop boat *No. 26:* Machinery overhauled and shafting lined up; minor repairs throughout the season	$287.40
Quarter boat *No. 0601:* Screens renewed and cabin repaired, hull calked afloat	305.65
Motor boat *Titania:* Engine and steering gear installed and hull painted	628.38
Model barge *No. 130* (belonging to St. Louis district): Docked; bottom, sides, and decks repaired, and calked	913.81
Model barges *Nos. 122, 123, 129, 131, 132* (belonging to St. Louis district): Sides and decks repaired; calked while afloat; new timberheads	3,048.35
Barge *No. 9304:* Received repairs to deck and rakes; was calked afloat	237.10
Barge *No. 9315:* Docked; received repairs to rakes, bottom, sides, deck, and bulkheads; calked throughout	1,748.92
Barge *No. 9319:* Deck repaired, timberheads renewed, hull calked while afloat	302.10
Barge *No. 9323:* Patched and calked afloat, fascine platform put on	310.25
Barge *No. 9325:* Docked, rakes repaired, bottom calked; fascine platform installed	1,053.65
Barge *No. 9328:* Fascine platform installed; calked and patched while afloat	312.80
Mooring barge *No. 1:* Timberheads renewed, deck patched and calked, hull calked afloat	492.41
Mooring barge *No. 2:* Timberheads renewed, deck patched and calked, hull patched and calked while afloat	487.50
Mooring barge *No. 9406:* Docked; bulkheads and bottom renewed; sides, rakes, and deck repaired and calked	1,627.75
Mooring barge *No. 9409:* Deck patched and calked, sides and rakes calked afloat	550.00
Mattress barge *No. 9308:* Docked; bottom and rakes renewed, sides and ways repaired, hull calked	1,533.10
Mattress barge *No. 9312:* Docked; bottom and rakes renewed; ends, deck, ways, and timberheads repaired; hull calked	1,889.12
Mattress barge *No. 0701:* Calked while afloat	89.15
Mattress barge *No. 0703:* Calked afloat	89.15
Three small flats docked, hulls and decks repaired, and calked	295.50
Skiffs overhauled, repaired, and calked	85.55
Floating dock: Minor repairs made at various times during the season	386.45
Miscellaneous: Repairs were made to tools and appliances at various times for construction parties, for fleet and office use, to ranges, stoves, wheelbarrows, blocks, etc	2,598.46
Total repairs to plant	46,709.85

RECAPITULATION.

Care of plant	$12,382.45
Repairs to plant	46,709.85
New plant	4,772.32
Material on hand	6,668.54
	70,533.16

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Statement of cost of plant and depreciation during the year ending April 30, 1910.

Name.	No.	Original cost.	Valuation last year.	Repairs.	Depreciation.	Present value.
Barges, model	2	$7,500.00	$2,642.59	.....	$1,250.00	$1,392.59
Barges, decked	2	6,200.00	3,515.77	.....	1,033.33	2,482.44
Barges, decked	6	19,020.00	6,975.47	$1,986.02	3,170.00	5,791.49
Barges, decked	3	7,400.00	5,060.85	302.10	1,400.00	3,962.95
Barges, decked	1	2,800.00	1,686.95	.....	1,686.95	Sunk.
Barges, decked	2	6,340.00	2,521.89	210.25	1,056.67	1,675.47
Barges, decked	3	9,300.00	5,120.36	1,053.65	1,550.00	4,624.01
Barges, decked	2	6,740.00	4,555.74	.....	1,123.33	3,432.41
Barges, decked	1	3,170.00	2,290.11	312.80	528.33	2,074.58
Barges, decked	2	7,063.01	5,885.85	.....	1,177.16	4,708.69
Barges, decked	4	22,498.81	18,749.00	.....	1,499.92	17,249.08
Barges, decked	5	28,637.66	24,240.22	.....	1,909.18	22,331.04
Barges, decked	2	11,139.16	10,478.16	.....	742.61	9,735.55
Barges, decked	1	5,569.58	5,239.08	.....	5,239.08	Sunk.
Barges, mattress	2	9,060.00	2,240.34	.....	1,510.00	730.34
Barges, mattress	2	5,600.00	7,129.60	3,422.22	1,706.66	8,845.16
Barges, mattress	2	10,240.00	9,314.78	178.30	1,706.66	7,786.42
Barges, mooring	2	4,046.00	7,912.07	979.91	1,582.41	7,309.57
Barges, mooring	2	7,500.00	4,896.05	2,177.75	1,250.00	5,823.80
Barges, flat	1	460.00	300.37	.....	75.00	225.37
Barges, flat	1	410.00	354.39	100.00	68.33	386.06
Barges, flat	1	496.00	173.99	100.00	82.67	191.32
Barges, flat	1	460.50	318.34	95.50	76.75	337.09
Dredge Wolf	1	8,000.00	3,294.62	.....	800.00	2,494.62
Derrick boat No. 3	1	2,956.00	3,271.00	258.54	296.60	3,233.94
Scows, dump	2	6,572.00	2,780.43	.....	657.20	2,123.23
Boats, quarter, Nos. 8, 11, 12	3	10,935.00	3,904.30	304.25	1,093.50	3,115.05
Boats, quarter, Nos. 25, 26	2	7,290.00	7,463.15	287.40	729.00	7,021.55
Boat, quarter, No. 27	1	2,788.00	3,449.00	355.00	278.80	3,525.20
Boat, quarter, No. 29	1	2,741.00	1,539.39	1,169.80	274.10	2,435.09
Boats, quarter, Nos. 206, 221	2	9,800.00	7,490.91	1,989.33	980.00	8,500.24
Boat, quarter, No. 0601	1	3,059.00	2,857.47	305.65	305.90	2,857.22
Hydraulic grader	1	30,232.00	5,575.21	687.46	666.84	5,595.83
Hydraulic grader	1	3,823.00	4,167.92	1,883.19	764.60	5,286.51
Floating dock	1	9,475.00	7,292.72	386.45	1,578.17	6,101.00
Machine-shop boat	1	8,501.00	3,708.07	655.85	850.00	3,513.92
Towboat Minnetonka	1	40,000.00	18,120.64	1,733.13	4,000.00	15,853.77
Towboat Chisca	1	25,900.00	22,880.66	1,885.40	2,590.00	22,176.06
Towboat Titan	1	23,500.00	18,946.81	9,487.17	2,350.00	26,083.98
Towboat Graham	1	9,500.00	12,872.91	648.45	950.00	12,571.36
Towboat Itasca	1	9,500.00	4,300.61	985.40	570.00	4,716.01
Steamer W. M. Rees	1	5,330.00	6,069.54	935.42	533.00	6,471.96
Steamer Unique	1	14,000.00	9,147.00	.....	9,147.00	Cond'mn'd.
Pile drivers	2	4,435.00	6,783.81	386.37	443.50	6,726.68
Motor boat	1	810.07	.....	68.31	87.83	790.55
Tools and appliances	....	49,668.43	43,330.43	5,288.46	4,966.84	43,652.05
Skiffs	28	857.50	533.67	85.55	142.91	476.31
Total	....	471,323.72	331,382.24	40,705.08	66,479.83	306,417.56

STONE SUPPLY.

Stone for the season's work was secured as follows:

From—	Riprap.		Spalls.	
	Cubic yards.	Price per cubic yard.	Cubic yards.	Price per cubic yard.
		Cents.		*Cents.*
K. H. Killebrew & Co., St. Louis, Mo	20,000	69.9	8,000	69.9
Nelson Sisson, Grand Tower, Ill	19,500	65.0	3,500	65.0

In addition to the above there was about 13,000 cubic yards of stone on hand at the beginning of the season.

All towing of stone was done by the United States with its own plant, the total cost being $17,629.30 for towing 23,672 cubic yards. The cost is somewhat

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higher than it should be, due to delays, such delays being about equally the fault of the United States and of the contractor.

It is very desirable that all stone be towed during high water, the plant not then being otherwise occupied and the actual towing being more readily done. This has in the past necessitated unloading the stone by hand on the bank near where it would be used and reloading it by hand when actually needed. This proved very expensive. A stone depot has been established in Hopefield Bend, Ark., equipped with steam operated cableway, transferring stone from barge to depot and reversing this operation. This, it is believed, will materially reduce the cost of handling the stone and will expedite such work.

The cableway was paid for as follows:

Constructing cableway.

Paid by Walnut Bend	$260.80
Paid by Old Town Bend	870.53
Paid by Hopefield Bend	876.38
Paid by Plum Point Reach	6,314.36
Total cost	8,322.07

BRUSH SUPPLY.

The brush and poles required for the season's work were obtained under contract with C. W. Hunter, of Memphis, Tenn., at a cost of $1.45 per cord, upon United States barges at the brush camp for work below Memphis, and $1.55 per cord for work above Memphis. The difference in cost of 10 cents per cord was made because United States plant was loaned to the contractor for brush and poles obtained at the lower figure.

PART II.—LEVEE WORK.

The work has been under the general charge of Junior Engineer Luther Y. Kerr, and this report is compiled from data furnished by him.

Upper St. Francis levee district (Cape Girardeau, Mo., to 70 R.).—(For reference to previous history see Reports Chief of Engineers, 1905, Supplement, p. 156, and 1907, vol. 3, p. 2685. See map No. 17 herewith.)

At the beginning of the season there were no contracts in force. During the season three pieces of work were put under contract. The details concerning these contracts are set forth in the following table:

Location.	Miles below Cairo.	Cubic yards.	Price.	Contractor.	Remarks.
			Cents.		
0/0 to 2/39	45 R (above)	209,000	15.36	P. H. Rogers	72 per cent completed.
45/6 to 46/24	15 R	98,000	16.24	Chas. W. Little	16 per cent completed.
46/24 to 47/6	16 R	35,000	17.9	Roach & Stansell	Not begun.

For the history of the first piece of work in the above list, see Reports Chief of Engineers, 1908, page 2737, and 1909, page 2748. The United States was put in possession of this right of way by decree of the United States court for the southeastern division, judicial district of Missouri, dated June 10, 1909. On approval of the Chief of Engineers a contract was entered into with P. H. Rogers, under his original bid, opened June 10, 1908, and work was begun July 17, 1909, to be paid for out of an allotment of $40,000 made by the Mississippi River Commission at its meeting in April, 1909. This contract was to be completed February 1, 1910. Completion was prevented by the late flood of the summer of 1909 and heavy rains and early freezing weather during the fall and winter. Work was discontinued in December under a waiver of the time limit. The contract will be completed during the coming summer.

The other two pieces were let in the regular way under bids opened July 19 and October 28, respectively, the contract time limit being December 31, 1910. Both pieces will be completed within that time.

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The Mississippi County levee board No. 1 has expended during the year $3,359.34 for repairs, rights of way, and a small amount of new work above Birds Point.

The new Scott County district No. 2 has about completed its levee along the lower half of its front. This levee begins about one-fourth mile above Philadelphia Point, Mo., and about 6 miles below Commerce, Mo., and follows closely down the river front a distance of 7 miles to connect with the end of the levee of the Mississippi County levee district No. 2. This new levee is built to a grade of 2, 2½, and 3 feet above 1903 high water, the grade varying with the height of the levee. It contains about 165,000 cubic yards and will cost the board about $25,000, which amount was obtained by a bond issue. The district comprises approximately 41,000 acres of land on which the benefit assessment of $126,000 has been made. On this benefit assessment the landowners have voted a 40 per cent levee tax.

Summary of earth in place.

Authority.	In place Apr. 30, 1909.	Added during year.	In place Apr. 30, 1910.	Under contract Apr. 30, 1910.
	Cu. yds.	*Cu. yds.*	*Cu. yds.*	*Cu. yds.*
United States	1,877,548	166,231	2,043,779	175,769
Levee boards	848,556	130,000	978,556	35,000
Total	2,726,104	296,231	3,022,335	210,769

No levee has been lost or abandoned in this district during the season.

There has been very little change in conditions on mile 31, just above Birds Point, Mo., where the levee was endangered by caving at the time of writing the last annual report. The loop which was to be built by the local board has not been required. There is no other point in this district where the levee is endangered by caving.

The general condition of the levee is good.

Map No. 17 shows the profile of the present levee with the elevations of several important high waters plotted thereon.

Reelfoot levee district (36–60 L.).—(For references to previous history, see Reports Chief of Engineers, 1905, Supplement, p. 157, and 1908, Part 3, p. 2737. See map No. 18, herewith.)

At the beginning of the season there was no work being done in this district.

By resolution of the Mississippi River Commission October 30, 1909, $10,000 was allotted for enlarging a part of that portion of this system lying in the State of Tennessee. Under this allotment bids were opened November 30, 1909, and a contract subsequently made for placing 35,000 cubic yards of enlargement, with the result shown below:

Location.	Miles below Cairo.	Cubic yards.	Price.	Contractor.	Remarks.
			Cents.		
16/40 to 18/40...	55 L	37,042	24.75	W. L. Mosby.....	13 per cent completed.

Ten thousand dollars was not sufficient to put this levee in good shape, but the idea was to cover the worst portion before the 1910 flood, and the contract was to be completed by March 1, 1910. The exceptionally bad weather, however, upset calculations, and the work was so delayed that an early high water necessitated cessation of work after 13 per cent of the material had been placed and 3,100 linear feet of levee worked over. The time limit in this case was waived, and the work will be completed during the coming summer. No work was done during the season by the local boards, except the general care of the levee.

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Summary of earth in place.

Authority.	In place Apr. 30, 1909.	Added during year.	In place Apr. 30, 1910.	Under contract Apr. 30, 1910.
	Cu. yds.	*Cu. yds.*	*Cu. yds.*	*Cu. yds.*
United States	992,776	4,876	997,652	32,166
Levee board	585,770	None.	585,770	None.
Total	1,578,546	4,876	1,583,422	32,166

No levee has been lost or abandoned in this district during the season.

Map No. 18 shows the profile of the present levee with the elevations of several important high waters plotted thereon.

Lower St. Francis levee district (79–298 R.).—(For references to previous history see Report Chief of Engineers, 1905, Supplement, p. 157. See map No. 19, herewith.)

At the beginning of the season contracts were in force, to be completed by December 31, 1909, and paid for out of the allotment of $90,000 made by the Mississippi River Commission at its meeting of April 19, 1908, the details of which are shown in the following table:

Location.	Miles below Cairo.	Actual cubic yards.	Price.	Contractor.	Remarks.
			Cents.		
31/8 to 36/0	115 R	166,047	13.44	Chas. W. Little	Completed June 12, 1909.
42/0 to 45/0	125 R	108,360	15.30	Roach & Stansell	Completed July 30, 1909.
Total		274,407			

Included in the above contracts was 1.8 acres of grubbing at $100 per acre, and 2.6 acres at $50 per acre.

On June 21, 1909, bids were opened and a contract subsequently made for work to be done in this district, to be completed February 1, 1910, as shown below:

Location.	Miles below Cairo.	Actual cubic yards.	Price.	Contractor.	Remarks.
			Cents.		
156/36 to 158/23	240 R	262,080	20.7	Roach & Stansell	New work, completed Mar. 12, 1910.

The above contract included 9.5 acres of heavy grubbing at $150.

On December 22, 1909, a contract was let for enlargement of levee, the work to be completed December 31, 1910, as shown below:

Location.	Miles below Cairo.	Cubic yards.	Price.	Contractor.	Remarks.
			Cents.		
98/0 to 99/40	185 R	61,000	17.7	Roach & Stansell	Not begun.

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The following table shows the amount of work done and under contract by the levee boards in this district during the past season:

[N—new levee; E—enlargement.]

Location.	Miles below Cairo.	Cubic yards in place.	Price.	Contractor.	Remarks.
St. Francis board, of Missouri:			*Cents.*		
E. 24/0 to 26/0	107 R	15,000	27.0	Chas. W. Little	71 per cent completed.
E. 40/26 to 41/19	123 R	17,245	27.0	W. A. Green	Completed Nov., 1909.
St. Francis board, of Arkansas:					
E. 57/0 to 65/35	150 R	175,391	24.5	Canal Construction Co.	72 per cent completed.
E. 197/0 to 201/45	275 R	67,290	24.0	Roach & Stansell	Completed June, 1909.
N. 208/0 to 209/0	283 R	259,770	34.0	do	95 per cent completed.
N. 209/0 to 210/0	283 R	70,527	20.0	do	Completed.
N. 210/0 to 211/0	283 R	12,351	17.0	do	Do.
N. 211/0 to 212/0	283 R	24,859	22.0	do	Do.
N. 212/0 to 213/0	283 R	52,747	26.0	do	38 per cent completed.
Total		695,180			

These boards have added to the levee during the past season 695,180 cubic yards, at a cost of $186,925. They have yet under contract 347,219 cubic yards, which will cost $88,993.65.

Summary of earth in place.

Authority.	In place Apr. 30, 1909.	Added during year.	In place Apr. 30, 1910.	Under contract Apr. 30, 1910.
	Cu. yds.	*Cu. yds.*	*Cu. yds.*	*Cu. yds.*
United States	9,962,185	301,267	10,263,452	61,000
Levee boards	14,538,511	695,180	15,233,691	347,219
Total	24,500,696	996,447	*25,312,143	408,219

* Reduced 185,000 cubic yards on account of levees lost and abandoned this season.

Lost and abandoned levee.—Seventeen hundred feet of levee, containing 11,000 cubic yards, has been lost by caving banks, mile 0/0 to 0/17 (78 R.).

At 156/36 to 158/24 (240 R.), 9,400 feet, containing 174,000 cubic yards, has been abandoned on account of the construction of a new loop back of Patton, Ark.

Caving banks.—The levee is threatened with caving banks at the following places:

Point Pleasant, Mo	79 R.	Turnages, Ark	186 R.
Linda, Mo	85 R.	Golden Lake, Ark	189 R.
Gayoso, Mo	106 R.	Patton, Ark	240 R.
Caruthersville, Mo	110 R.	Porter Lake, Ark	260 R.
Cottonwood Point, Mo	124 R.	Walnut Bend, Ark	281 R.
Barfield, Ark	142 R.		

The caving at Point Pleasant, Mo. (79 R.), has destroyed 1,700 feet of the upper end of this system, and will necessitate abandoning all of the first mile. The United States proposed to loop this portion during 1909, but the local authorities were unable to secure the right of way.

The next points requiring immediate attention are Golden Lake (189 R.) and Walnut Bend (281 R.). The caving at Golden Lake is within 400 feet of the levee, having caved 200 feet in the eighteen months ending November, 1909. A new loop, about 6,400 feet long and containing about 220,000 cubic yards, will have to be constructed here within a very short time unless provision is made for revetting the bank, as has been done at Walnut Bend. The progress of caving at the other points is being observed.

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Map No. 19, herewith, shows the profile of the present levee with the elevation of several important high waters plotted thereon.

Upper Yazoo levee district (244–365 L.).—(For references to previous history see Report Chief of Engineers, 1905, Supplement, p. 158. See map No. 21 herewith.) The levees in this district are in such excellent condition and the local levee board is so well equipped to take care of them that no allotments for new work were made during the past year. The cost of the work done by this board during the season is $187,581.06.

The levee is threatened by caving banks at Star Landing, Miss. (257 L.), Trotters Landing, Miss. (303 L.), and Sunflower Landing, Miss. (353 L.). Revetment work or a loop will be needed at the last-named point during the coming season and at the first-named point within three years. The situation at Trotters Landing is not serious; looping will be easy and cheap.

Summary of earth in place.

Authority.	In place Apr. 30, 1909.	Added during year.	In place Apr. 30, 1910.	Under contract Apr. 30, 1910.
	Cu. yds.	*Cu. yds.*	*Cu. yds.*	*Cu. yds.*
United States	7,495,682	None.	7,495,682	None.
Levee board	22,486,929	777,059	23,263,988	7,820
Total	29,982,611	777,059	*30,443,758	7,820

*Reduced 315,912 cubic yards for levee abandoned at Star Landing, Miss. (257 L.).

Map No. 21 shows the profile of the present levee with the elevation of several important high waters plotted thereon.

White River levee district (306–385 R.).—(For references to previous history, see Report Chief of Engineers, 1905, Supplement, p. 159. See map No. 20 herewith.) At the beginning of this season there were no uncompleted contracts in this district, and the only piece of work put under contract by the United States during the season was for the purpose of restoring the Avenue spur, which was badly cut by the high water of 1909. The details of work are as follows:

Location.	Miles below Cairo.	Actual cubic yards.	Price.	Contractor.	Remarks.
			Cents.		
Mile 42	347 R	3,506	30	W. B. Bush	Completed Feb. 1, 1910.

Work by levee machine.

Location.	Miles below Cairo.	Actual cubic yards.	Cost per cubic yard.
			Cents.
24/46 to 25/34	333 R	63,711	25.5

Contract by the Cotton Belt levee board.

Location.	Miles below Cairo.	Cubic yards (actual).	Price.	Contractor.	Remarks.
			Cents.		
20/11 to 22/0	326 R	150,000	17.8	Roach & Stansell	20 per cent completed.

In addition to the above contract work, this board has expended $5,624.24 for rights of way.

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Summary of earth in place.

Authority.	In place Apr. 30, 1909.	Added during year.	In place Apr. 30, 1910.	Under contract Apr. 30, 1910.
	Cu. yds.	*Cu. yds.*	*Cu. yds.*	*Cu. yds.*
United States	8,990,251	63,711	9,053,962	None.
Levee boards	1,948,319	28,000	1,976,319	122,000
Total	10,938,570	91,711	11,030,281	122,000

No levee was lost or abandoned on account of caving banks or new loops.

Map No. 20 shows the profile of the present levee with the elevations of several important high waters plotted thereon.

Caving banks.—Caving continues in the bend below Old Town (325 R.). The caving below Fergusons (365 R.) is not of a serious nature at present.

Levee machine.—The season with the levee machine was a short one. High water prevented work until August 19, 1909, and bad weather conditions practically stopped work early in December, although the machine was nominally operated until January 26, 1910. During the period when the machine was in operation much time was lost due to breaking cables and to repairing the boiler. Considerable delay and some of the breakages were due to the poor lighting of the grounds. An electric lighting plant has been installed on the machine, the boiler has been repaired, and with other important changes that are being made the machine will be in better shape for this season's work than ever before.

The following table shows the amount expended by the United States in the various districts for the year ending April 30, 1910:

District.	Total expended.	Construction.	Engineering and local inspection.	Maintenance and repairs.	High water.	Surveys.	Office.	General inspection.
		Per ct.	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*
Upper St. Francis	$27,666.64	79.4	11.7	0.5	.....	0.1	7.4	0.9
Reelfoot	858.62	66.4	33.6	.....	.....	.....	.....	.....
Lower St. Francis	74,767.71	91.5	5.1	.1	.....	1.1	1.1	1.1
White River:								
Contract	4,571.68	21.7	26.0	8.4	4.4	5.3	6.0	18.2
Levee machine No. 2	23,512.09	69.0	7.9	23.1	.....	.....	.....	.....
Total	131,396.74							

Five per cent of the cost of care, repair, and depreciation of plant is chargeable to levees, and this is prorated to each district according to the total mileage of existing levees, as shown in the following table:

District.	Length of district.	Levee built.	Care of plant.	Repair of plant.	Depreciation of plant.
	Miles.	*Miles.*			
Upper St. Francis	90	57.25	$75.25	$275.20	$393.50
Reelfoot	21	21.0	26.47	100.50	144.27
Lower St. Francis	212	207.5	264.50	999.70	1,425.73
Upper Yazoo	124	124.0	158.00	599.00	851.88
White River	74	74.0	94.90	361.09	508.61
Total	521	483.75	619.12	2,335.49	3,323.99

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The levees generally are in excellent condition. Due to efforts commenced some years ago, practically all cross fences have been removed from all levees, and the consequent opening of the levees to grazing has been of tremendous benefit in keeping weeds down, practically eliminating the expense of cutting weeds, and also facilitating inspection of the levees very much.

Sowing with Bermuda grass seed was tried, but has not given as general satisfaction as spot sodding. However, it is believed that seeding done early in the spring on freshly prepared ground will give good results.

A valuable decision was rendered by the United States district court for the eastern district of Arkansas, at its March, 1910, term, in Helena, Ark., in the case of the United States *v.* H. E. Bowen. The court held that the United States did not have to show damage in order to obain a conviction under the law constituting it an offense to make use of a public work for any purpose.

There has been no flood stage in the river this year, and hence no high-water expense for damage to levees.

No estimate of the quantity of earth needed to complete the levees in the upper and lower St. Francis and the Reelfoot districts is given, since statements based upon the present grade, which is too low, are misleading. The matter of adoption of a new grade is now under discussion, and it is hoped reliable estimates can be given in next report.

SURVEYS.

This work has been under charge of Junior Engineer L. L. Griffith, and data for this report have been prepared by him.

The survey party was organized August 22, 1909, to make low-water surveys and complete the report on willow and gravel bars. After a survey at Osceola, Ark., to obtain information for the construction party, the examination of the willow and gravel bars from Memphis, Tenn., to the mouth of White River was made and report submitted. A detailed report of the various other surveys follows:

Slough Landing Neck, Kentucky and Tennessee (60 L.).—(See map No. 3.) The results of this survey show a continued caving on both sides of the neck. On the upper side the average caving is 300 feet and the greatest caving 450 feet during the past year; and on the lower side the average caving is 450 feet and the greatest caving 800 feet in the same time. Map No. 3 shows the changes in the shore lines and the prevailing depths in both caving bends. The following data is obtained from the original field sheet drawn to a larger scale than the map herewith and shows the most reliable average rate per year:

	Total caving in bight of bend, 1902–1909.	Average caving in bight of bend, 1908–9.	Average caving in bight of bend per year, 1902–1909.
	Feet.	*Feet.*	*Feet.*
Upper side of neck	2,400	300	350
Lower side of neck	3,600	450	500

The points of greatest caving not being opposite each other, the line of shortest distance, now 7,100 feet, between the caving bends has only been decreased by 300 feet in the past year, while the total greatest caving was 1,100 feet. Levels were run which verified the contours on the 1:20,000 map, and this neck which has hitherto been above overflow will be submerged to a depth of 3 feet by an extreme high water, as stated in last report.

New Madrid, Mo. (70 R.).—Map No. 3 of Slough Landing Neck shows the location of the revetment and caving bend below. The soundings over the revetment, with the exception of a 5-foot scour on the mat on range 12 and a 5-foot fill in the channel at the lower end, show no change from last year.

Point Pleasant, Mo. (78 R.).—Map No. 3 of Slough Landing Neck also shows the result of a shore line and levee survey from Point Pleasant to Linda, Mo. One mile above Point Pleasant the caving has amounted to 3,000 feet from 1902 to 1909, or 428 feet per year.

Caruthersville, Mo. (110 R.).—Map No 4 shows the revetment and shore lines. The soundings over the revetment show no change from last year,

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except a 5-foot scour at zero stage on ranges 16 to 18, which indicates a weakening, if not a break, in the revetment at this point

Plum Point reach (147 to 186 miles below Cairo).—Map No. 5 shows the progress of the changes reported last year in Plum Point reach, details of which are as follows:

Chute of Island 26 (150 L.).—(See map No. 5, Plum Point reach.) The survey of this chute indicates a continued enlargement in width and depth, the principal change being the disappearance of the bar at the mouth of lower Forked Deer River. Recent reports indicate that the main channel is now through this chute, in which case the channel distance has been shortened 2 miles.

Daniels Point, Ark. (152 R.).—(See map No. 5, Plum Point reach.) The cross sections over the revetment show continued caving at the head of the work, which has become active from the head of the work to Fishers Landing, and in the unprotected pockets at the lower end of the revetment. On ranges 42 to 70 a fill varying from 10 to 30 feet on the bar side of the channel is shown. The cross section over the reach ranges in O'Donalds Bend do not show any general fill such as would be expected from the increased sections in the chute of Island 26.

Chute of Towhead of Ashport bar (155–157 R.).—(See map No. 5, Plum Point reach.) This chute is now the main channel of the river, the towhead of Ashport bar having entirely disappeared, except the small middle bar which made down from the lower end of the towhead as the change took place.

Ashport Bend, Tenn. (154–157 L.).—(See map No. 5, Plum Point reach.) The soundings over the revetment show several breaks near the lower end, indications of which were reported last year, and for the lower 800 feet a scour of from 10 to 30 feet behind the mat. Caving has become active from the foot of the work to the head of Gold Dust Chute and on the head of Elmot bar. Many old dikes in this vicinity have so far prevented the low-water channel from following the new caving. When these obstructions are undermined or caving behind them has progressed far enough to accommodate the entire channel, the current will attack Fletchers Bend revetment nearly at right angles, and these conditions will favor an increased flow through Gold Dust Chute.

Gold Dust Chute (158–164 L.).—(See map No. 5, Plum Point reach.) The survey of this chute is compared with the survey of 1907, and shows during the two years a marked increase in the depth on the river sections at the head of the chute and an increase in width of all sections in the chute, the depths remaining practically the same as in 1907. There is no low-water flow between Elmot bar and Island 30. The distance through the chute is 3 miles less than around by Fletchers Bend.

Fletchers Bend, Ark. (158–161 R.).—(See map No. 6.) The cross sections over the revetment show a general scour of 5 to 45 feet in the channel from range 128 to range 168, and of 5 to 30 feet on the slope and back of the edge of the mats from range 142 to range 170. This is probably due to changing conditions at the head of the work, where a 5 to 15 foot fill is shown. These conditions are explained under Ashport Bend, and are similar to those at Hopefield Bend.

Osceola bars, Ark. (165 R.).—(See map No. 7.) Cross sections were taken over the entire work and show practically no change except small settlement on mat No. 1. Caving below the work is still active and begins at the foot of the work, damaging mat No. 3 in the head of Osceola Chute.

Bullerton bar, Ark. (168 R.).—The bar which has been forming over this work for several years now covers the whole work, and no survey was made at this point.

Bend of Island 35 (186–196 R.).—(See map No. 8.) This levee and shore-line survey shows the caving throughout the bend and the points where the levee is threatened. The next low-water survey will include the chute of Island 35, in order to observe the results of a strong flow through the chute, the distance around the bend being 12 miles and through the chute 6½ miles.

St. Clair, Ark. (223 R.).—A levee and shore-line survey was made at this point to determine the rate of caving. No map is submitted.

Hopefield Bend, Ark. (227–230 R.).—(See map No. 9.) The recent breaks in the revetment were caused by the change in the crossing at the head of the bend, shown on map No. 9 herewith. This change, which is in the nature of a cut-off, makes the current attack the revetment nearly at right angles

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and at a point not previously subjected to such attack. The cross sections over the revetment show these breaks between ranges 34 and 50 east and indications of a probable continuation of the breaks 1,200 feet below and 500 feet above their present limits. Other changes are: A 15-foot fill in the channel on ranges 98 to 92, covering the pocket repaired in 1907 at the foot of the work; a disturbance on ranges 78, 76, 74, and 72, reported as a 10-foot scour in the channel in 1908, which now shows a continued scour in the channel and a 5-foot scour on the slope on two of the ranges; and a 10-foot fill at the outer edge of the mats on ranges 6 west to 44 west at the head of the work.

Memphis bar and revetment (229–232 L.).—(See map No. 9.) The cross sections in front of the bar and over the revetment show various changes from year to year, due to eddy action below the mouth of Wolf River and changes in the current in Hopefield Bend. From the mouth of Wolf River to the Frisco incline the bar continues to recede, amounting to a 15-foot scour on the slope of the cross sections, while in the channel on the same ranges occur scour and fills varying from 30-foot scour to 30-foot fills. Below the incline there is a tendency to fill, especially on the slope, and the bar continues to make down on the wharf. Below the custom-house the sections show but little change on the slope, while in the channel there is a uniform scour of 10 feet.

Patton, Ark. (240 R.).—(See map No. 10.) The caving bank at this place was located in 1909 and again in January, 1910, and shows active caving in the chute back of Presidents Island, threatening the levee just above the junction of the new loop.

Star Landing, Miss. (257 L.).—(See map No. 11.) A shore-line survey was made to determine the rate of caving, which since 1904 amounts to 1,500 feet, or 300 feet per year.

Porter Lake, Ark. (261 R.).—(See map No. 11.) The result of the survey at this place shows that the caving has been most active above the threatened point in the levee. Caving has continued, however, along the entire front and the shortest distance to the levee is 900 feet compared with 945 feet last year.

Walnut Bend, Ark. (276–284).—(See map No. 12.) The survey at Walnut Bend included the location of the shore lines on the upper and lower sides of the neck, as well as soundings throughout the bend and over the revetment. The shortest distance across the neck is 6,100 feet, but the caving on the upper side during the year was only 100 feet, and on the lower side 250 feet in five years, or 50 feet per year. Both abattis dikes were broken by the high water of 1909, as shown on map No. 12. The cross sections over the revetment show a decided deepening of 10 to 25 feet in the channel along the entire revetment and a scour through or settling of mats on the slope of 5 to 12 feet.

Helena, Ark. (307 R.).—(See map No. 13.) The revetment survey at Helena included a shore-line survey of the bend above, showing the caving near Trotters Landing. The cross sections over the revetment show only a few irregular and small changes on the slope and no changes in the channel. The changes on the slope are not regular or large enough to indicate a break in the revetment.

Oldtown, Ark. (325 R.).—(See map No. 14.) The cross sections over the revetment show a 5 to 10-foot scour at the outer edge of the mats from ranges 118 to 142; otherwise there has been no change.

Sunflower Bend (352–357 L.).—(See map No. 15.) A levee and shore-line survey was made from Sunflower Landing, Miss., to Lake Charles, Miss., showing recent active caving, which threatens the levee near the expensive Hushpuckana Creek crossing.

Ferguson, Ark., to Beiths, Ark. (360–367 R.).—(See map No. 16.) A shore-line survey was made from Fergusons, Ark., to Beiths, Ark., to determine the amount of caving during the year. As shown on the map herewith the caving is slight.

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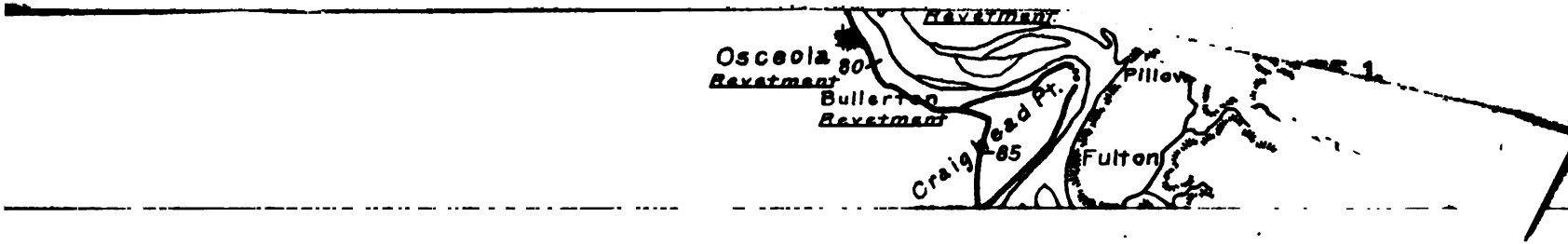

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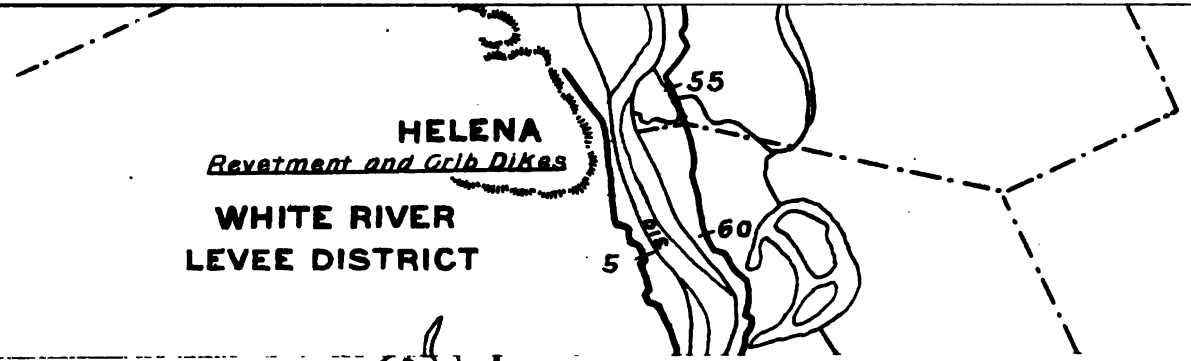

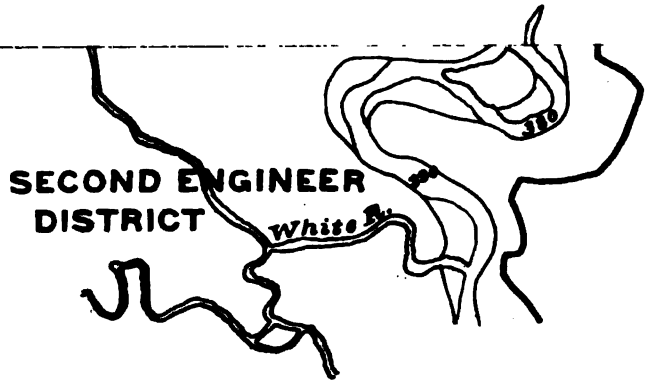

Index Map of Mississippi River

SCALE OF MILES

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To accompany my annual report for the fiscal year ending June 30, 1910

Maj. Wacker

Major, Corps of Engineers, U.S.A.

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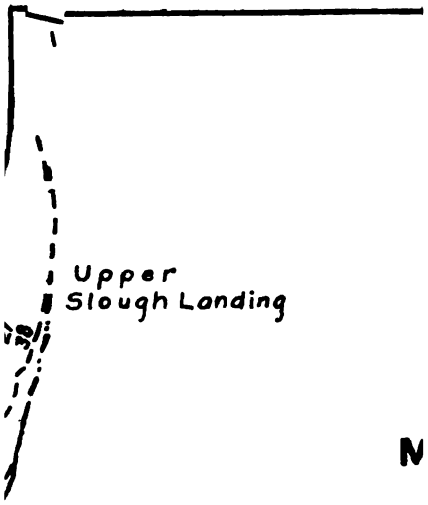

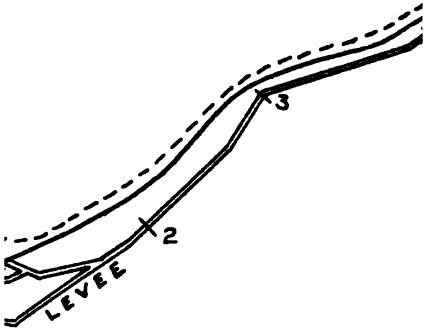

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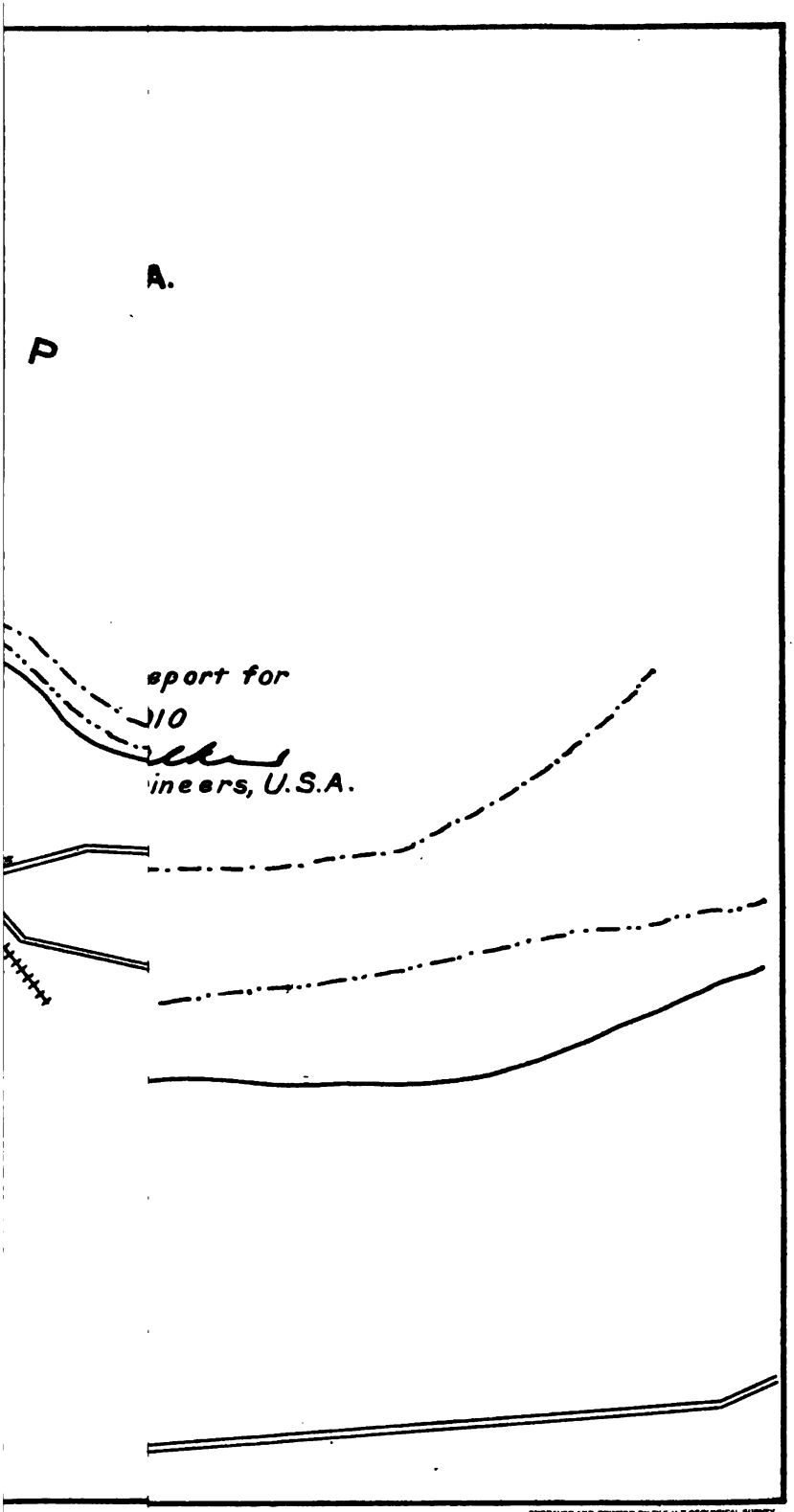

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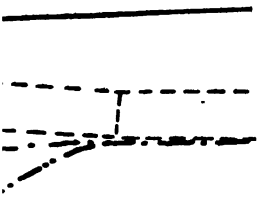

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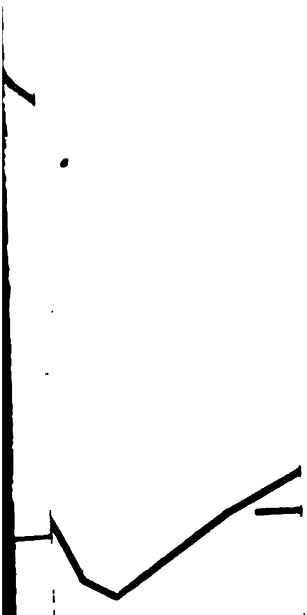

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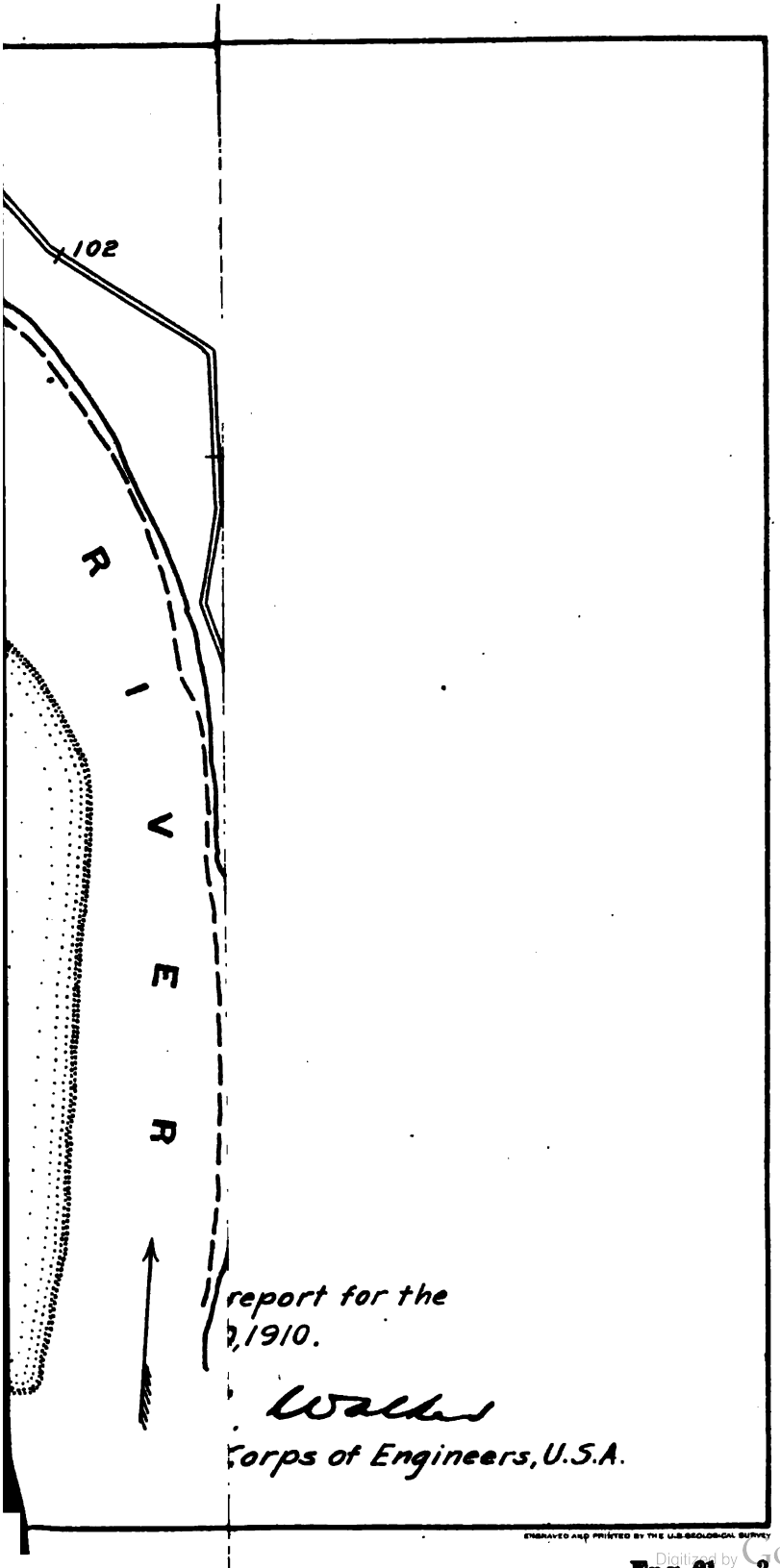

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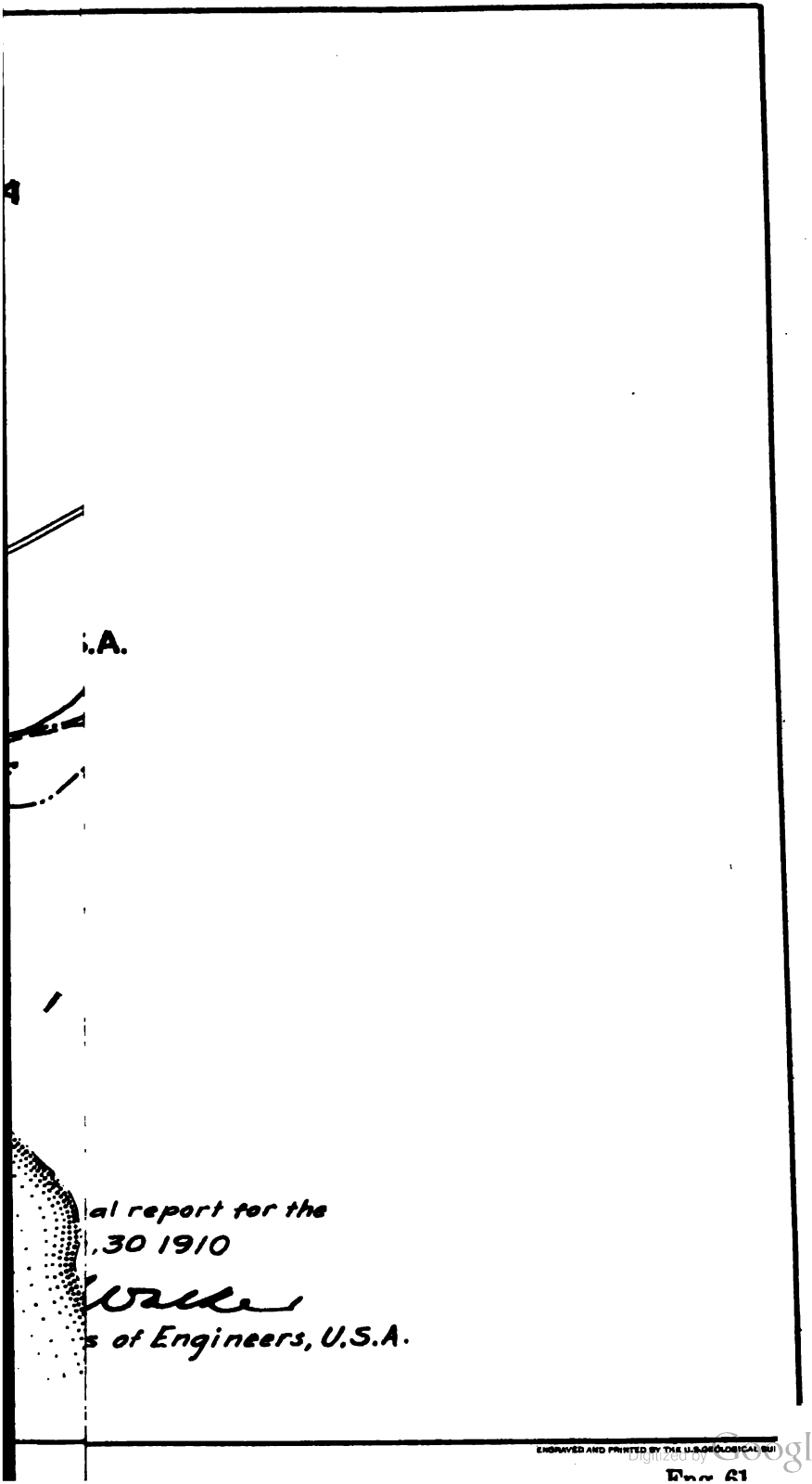

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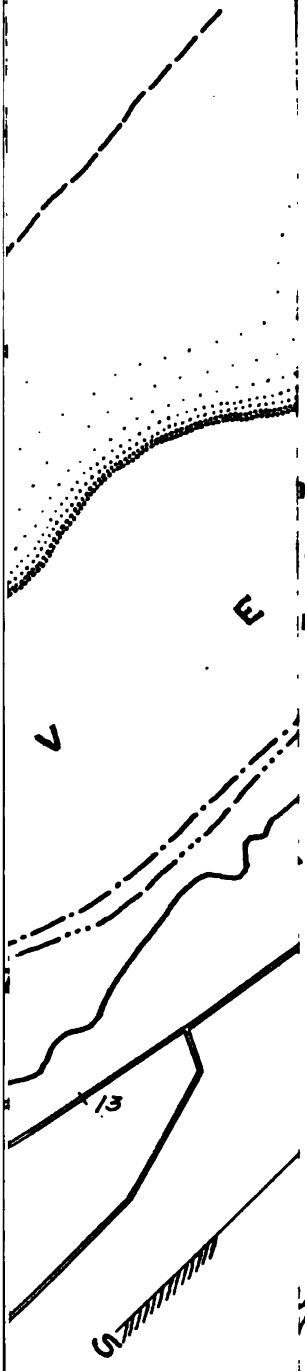

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M. Walker

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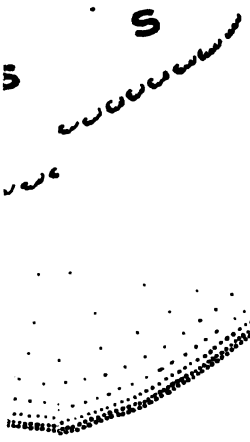

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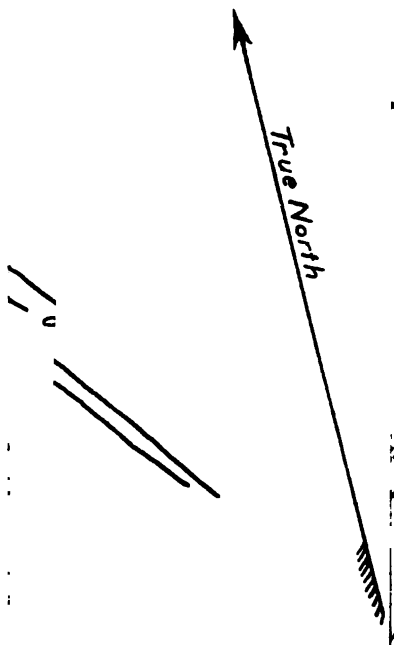

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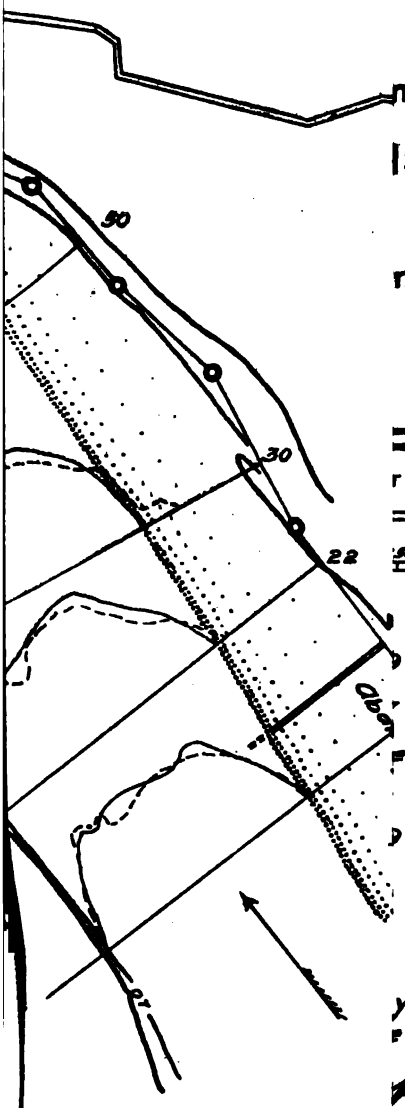

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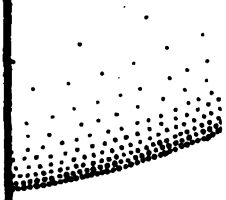

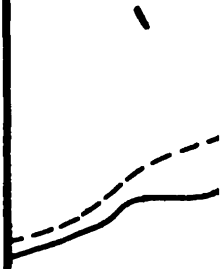

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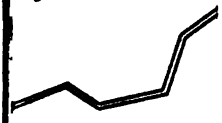

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M. L. Walker
Major, Corps of Engineers, U.S.A.

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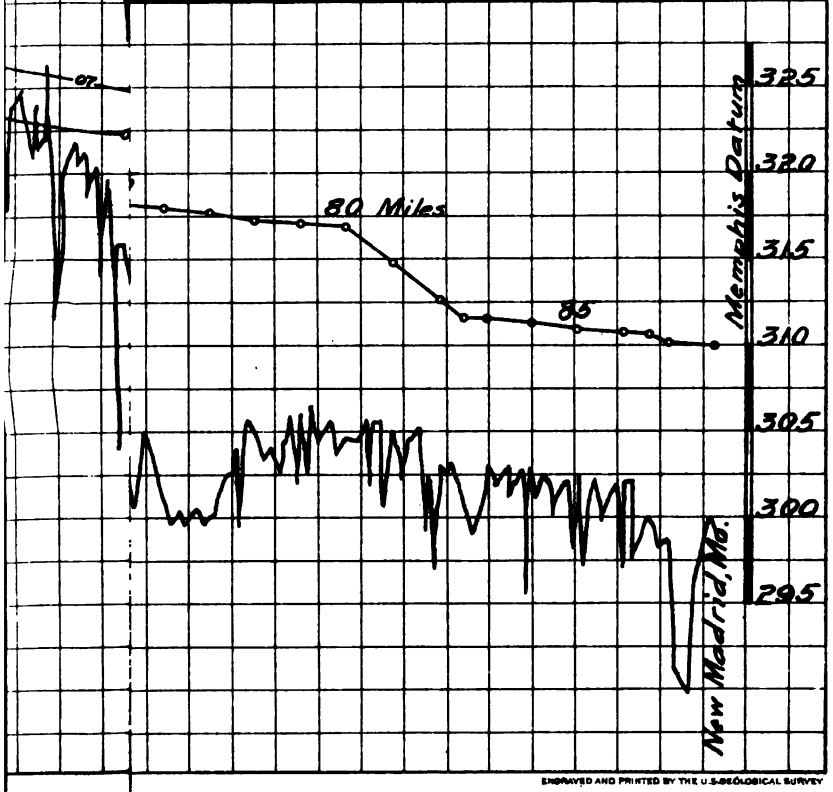
To accompany my annual report for the fiscal year ending June 30, 1910.

M. Walker
Major, Corps of Engineers, U.S.A.



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To accompany my annual report for the fiscal year ending June, 30, 1910.

M. C. Wacker

Major, Corps of Engineers, U.S.A.

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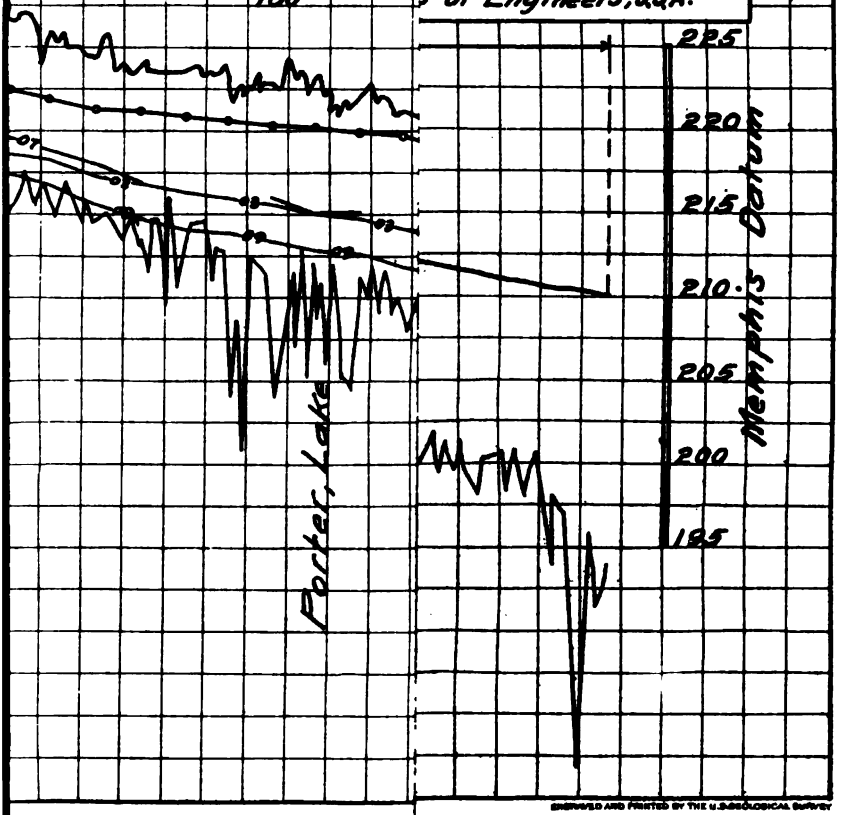

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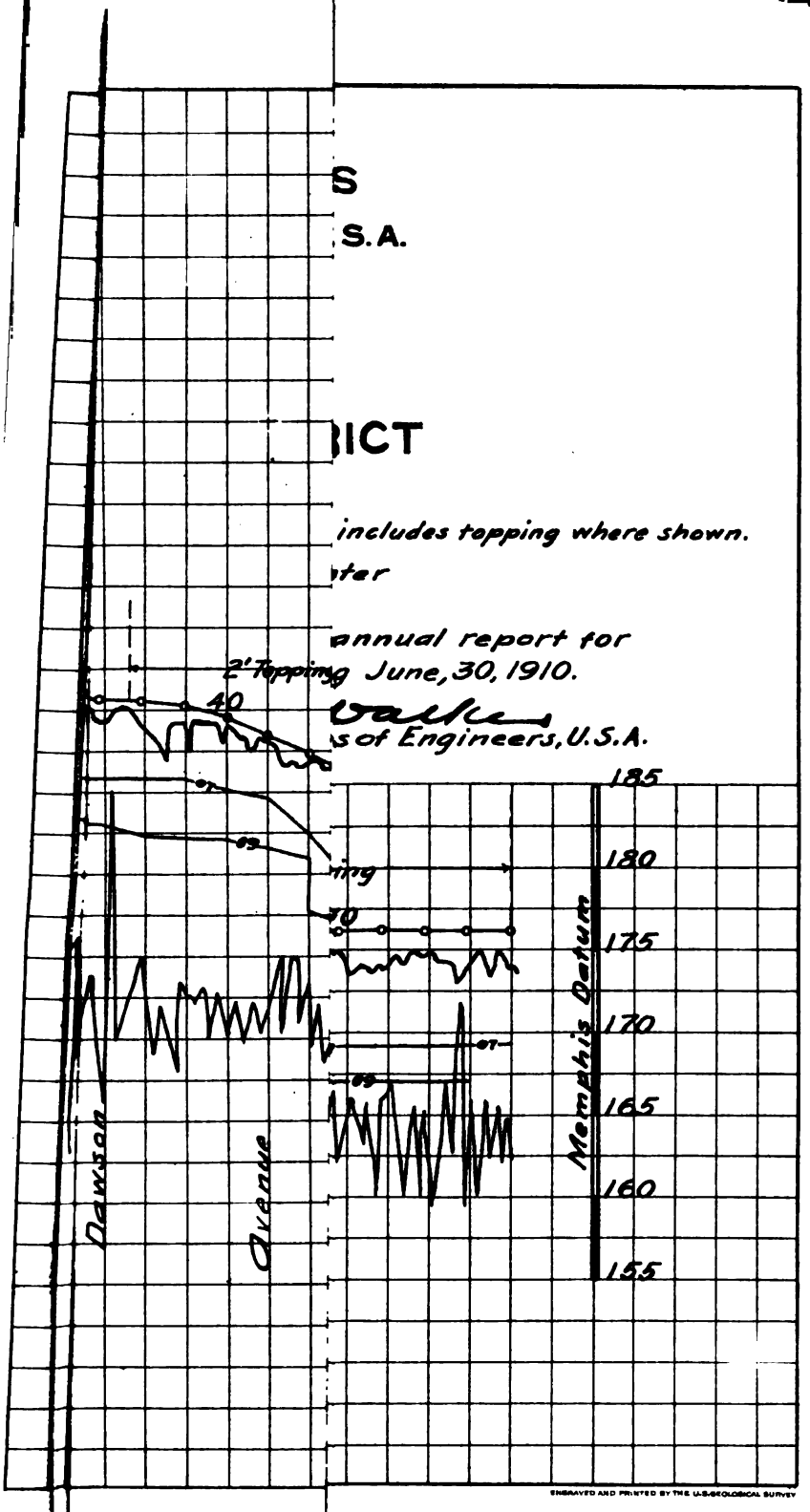

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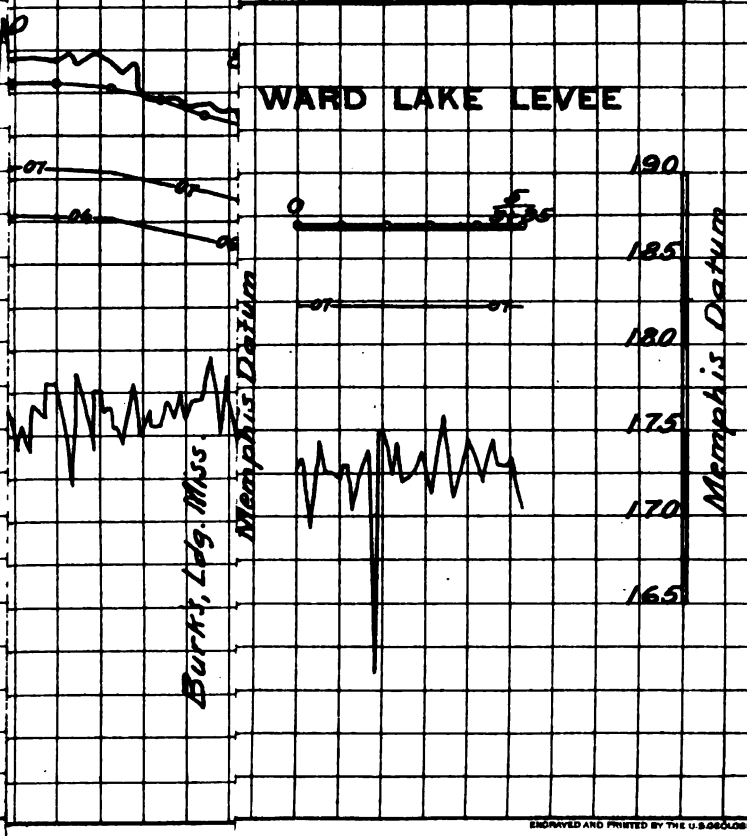

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Cost of surveys May 1, 1909, to April 30, 1910.

	Days in field.	Services.	Subsistence.	Supplies.	Coal.	Drafting room.	Repair of instruments.	Transportation.	Total.
llow bars	12½	$418.60	$78.32	$38.15	$20.32	$304.11	$18.02	.....	$877.52
per St. Francis district	.....	366.33	.....	.....	.....	.....	.....	.....	366.33
ver St. Francis district	.....	.....	.....	.....	.....	.....	.....	$20.05	20.05
ite River district	.....	155.00	.....	.....	.....	.....	.....	.....	155.00
igh Landing Neck	6	204.60	45.18	16.50	10.80	151.92	8.82	.....	437.82
Madrid, Mo	2	78.20	15.06	5.50	3.60	50.64	2.94	.....	155.94
it Pleasant, Mo	1	34.10	7.53	2.75	1.80	25.32	1.47	.....	72.97
oso to Caruthersville	1	34.10	7.53	2.75	1.80	25.32	1.47	.....	72.97
thersville, Mo	4	136.40	30.12	11.00	7.20	101.28	5.88	.....	291.88
r Styx	1	34.10	7.53	2.75	1.80	25.32	1.47	.....	72.97
e of Island 36	3	102.30	22.59	8.25	5.40	75.96	4.41	.....	218.91
els Point	4	136.40	30.12	11.00	7.20	101.28	5.88	.....	291.88
Point reach	10	331.00	70.30	27.50	18.00	253.20	14.70	.....	714.70
ort Bend	3	102.30	22.59	8.25	5.40	75.96	4.41	.....	218.91
hers Bend	8	272.80	60.24	22.00	14.40	202.56	11.76	.....	583.76
ola, Ark	5	170.50	37.65	13.75	9.00	126.60	7.35	.....	364.85
n Lake, Ark	2	78.20	15.06	5.50	3.60	50.64	2.94	.....	155.94
air, Ark	1	34.10	7.53	2.75	1.80	25.32	1.47	.....	72.97
field Bend	6	204.60	45.18	16.50	10.80	151.92	8.82	.....	437.82
his Harbor	3	102.30	22.59	8.25	5.40	75.96	4.41	.....	218.91
n, Ark	½	17.05	3.76	1.37	.90	12.66	.73	.....	36.47
Lake, Ark	2½	119.35	26.35	4.12	6.30	88.62	5.14	.....	249.88
it Bend, Ark	7	238.70	52.71	19.25	12.60	177.24	10.29	.....	510.79
anding, Miss	½	17.05	3.76	1.37	.90	12.66	.73	.....	36.47
a, Ark	4	136.40	30.12	11.00	7.20	101.28	5.88	.....	291.88
own, Ark	4	136.40	30.12	11.00	7.20	101.28	5.88	.....	291.88
wer, Miss	1	34.10	7.53	2.75	1.80	25.32	1.47	.....	72.97
ltons, Ark	1	34.10	7.53	2.75	1.80	25.32	1.47	.....	72.97
rs, Miss	1	34.10	7.53	2.75	1.80	25.32	1.47	.....	72.97
Miss	1	34.10	7.53	2.75	1.80	25.32	1.47	.....	72.97
	96	3,797.28	702.06	262.26	170.62	2,418.33	140.75	20.05	7,511.35

E.—While this table shows the total cost of surveys made during the year, the cost h surveys as were made in connection with river-improvement work were paid from spective allotments for such work.

INCLOSURES.

following inclosures accompany this report, of which they are parts:
No. 1.—District map, first district.
No. 2.—District map, second district.
No. 3.—Slough Landing Neck, New Madrid, Mo., and Point Pleasant, Mo.
No. 4.—Caruthersville, Mo.
No. 5.—Plum Point reach.
No. 6.—Fletchers Bend.
No. 7.—Osceola bars.
o. 8.—Bend of Island 35.
o. 9.—Hopefield Bend and Memphis Harbor.
o. 10.—Patton, Ark.
o. 11.—Star Landing and Porter Lake.
o. 12.—Walnut Bend.
o. 13.—Trotters Landing, Miss., and Helena reach.
o. 14.—Old Town, Ark.
o. 15.—Sunflower to Lake Charles.
o. 16.—Ferguson to Knowlton.
o. 17.—Upper St. Francis levee district.
o. 18.—Reelfoot levee district.
. 19.—Lower St. Francis levee district.
. 20.—White River levee district.
. 21.—Upper Yazoo levee district.
tatements and abstracts of contracts in force will be forwarded July 1.
tfully submitted.

M. L. WALKER,
Major, Corps of Engineers.

H. BIXBY,
rps of Engineers, U. S. Army,
President Mississippi River Commission.

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MONEY STATEMENT.

Appropriation for improving Mississippi River, first and second districts.

NEW MADRID, MO.

July 1, 1909, balance unexpended		$1,702.14
July 1, 1910, balance unexpended		1,702.14

CARUTHERSVILLE, MO.

July 1, 1909, balance unexpended		86.51
June 30, 1910, amount expended during fiscal year		86.51

CHUTE OF ISLAND 26 (ABATTIS DIKES).

July 1, 1909, balance unexpended		13,914.41
July 15, 1909, amount transferred to Hopefield Bend (E. D. 15927/246)		13,914.41

PLUM POINT BEACH.

July 1, 1909, balance unexpended		8,660.79
Amount allotted from appropriation for improving Mississippi River (sundry civil act), approved March 4, 1909		60,000.00
July 19, 1909, amount refunded on account of overpayment in voucher 20, January, 1909		.25
		68,661.04
Amount transferred to appropriation for improving Mississippi River, from mouth of the Ohio River to Minneapolis, Minn. (between mouth of Ohio and Missouri rivers), for rent of plant	$2,405.09	
Amount transferred to secretary Mississippi River Commission (in payment for coal)	3,656.23	
Amount transferred to appropriation for clothing, camp, and garrison equipage, fiscal year 1910 (in payment for flags)	18.67	
June 30, 1910, amount expended during fiscal year	49,251.35	
		55,331.34
July 1, 1910, balance unexpended		13,329.70
July 1, 1910, outstanding liabilities		5,312.50
July 1, 1910, balance available		8,017.20

HOPEFIELD BEND.

July 1, 1909, balance unexpended		4,805.94
Amount allotted from appropriation for improving Mississippi River (sundry civil act), approved March 4, 1909		30,000.00
Amount received by transfer from Chute of Island 26, (abattis dikes)		13,914.41
Amount received by transfer from White River levee district		10,000.00
		58,720.35
Amount transferred to appropriation for improving Mississippi River from mouth of Ohio River to Minneapolis, Minn. (between mouths of Ohio and Missouri rivers) for rent of plant	$693.80	
Amount transferred to secretary Mississippi River Commission (in payment for coal)	2,009.36	
June 30, 1910, amount expended during fiscal year	46,373.91	
		49,077.07
July 1, 1910, balance unexpended		9,643.28
July 1, 1910, outstanding liabilities		8,000.00
July 1, 1910, balance available		1,643.28

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WALNUT BEND.

July 1, 1909, balance unexpended		$2,866.39
Amount allotted from appropriation for improving Mississippi River (sundry civil act), approved March 4, 1909		35,000.00
		37,866.39
Amount transferred to secretary Mississippi River Commission (in payment for coal)	$3,289.13	
Amount transferred to appropriation for improving Mississippi River from mouth of Ohio River to Minneapolis, Minn. (between mouths of Ohio and Missouri rivers), for rent of plant	2,116.22	
June 30, 1910, amount expended during fiscal year	30,816.63	
		36,221.98
July 1, 1910, balance unexpended		1,644.41
July 1, 1910, outstanding liabilities		1,300.00
July 1, 1910, balance available		344.41

OLD TOWN BEND.

July 1, 1909, balance unexpended		$152.85
Amount allotted from appropriation for improving Mississippi River (sundry civil act), approved March 4, 1909		85,000.00
		85,152.85
Amount transferred to the appropriation removing obstructions in Mississippi, Atchafalaya, and Old rivers, 1910, for coal	$121.00	
Amount transferred to secretary Mississippi River Commission (in payment for coal)	6,100.76	
Amount transferred to appropriation for improving Mississippi River, from mouth of the Ohio River to Minneapolis, Minn. (between mouths of Ohio and Missouri rivers) for rent of plant	2,363.89	
June 30, 1910, amount expended during fiscal year	68,849.19	
		77,434.84
July 1, 1910, balance unexpended		7,718.01
July 1, 1910, outstanding liabilities		7,000.00
July 1, 1910, balance available		718.01

UPPER ST. FRANCIS LEVEE DISTRICT.

July 1, 1909, balance unexpended		$421.52
Amount allotted from appropriation for improving Mississippi River (sundry civil act) approved March 4, 1909		65,000.00
December 11, 1909, amount refunded on account overpayment in voucher 78, July, 1909		1.40
		65,422.92
June 30, 1910, amount expended during fiscal year		28,245.97
July 1, 1910, balance unexpended		37,176.95
July 1, 1910, outstanding liabilities		30,983.26
July 1, 1910, balance available		6,193.69

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REELFOOT LEVEE DISTRICT.

Amount allotted from appropriation for improving Mississippi River (sundry civil act), approved March 4, 1909		$10,00
June 30, 1910, amount expended during fiscal year		98
July 1, 1910, balance unexpended		9,01
July 1, 1910, outstanding liabilities		8,54
July 1, 1910, balance available		47

LOWER ST. FRANCIS LEVEE DISTRICT.

July 1, 1909, balance unexpended		$12,28
Amount allotted from appropriation for improving Mississippi River (sundry civil act), approved March 4, 1909		75,00
Amount erroneously deducted twice on account Treasury settlement No. 5175, with Southern Railway Company for freight on envelopes		2
		87,29
Amount Treasury settlement No. 8761, being amount paid Chicago, Rock Island and Pacific Railroad for passenger service during April, 1909	$0.52	
Amount transferred to secretary Mississippi River Commission (in payment for coal)	223.44	
June 30, 1910, amount expended during fiscal year	67,402.21	
		67,62
July 1, 1910, balance unexpended		19,66
July 1, 1910, outstanding liabilities		9,49
July 1, 1910, balance available		10,17

WHITE RIVER LEVEE DISTRICT.

Amount allotted from appropriation for improving Mississippi River (sundry civil act), approved March 4, 1909		$50,00
Amount Treasury settlement No. 9621, being amount paid Southern Railway Company for freight on envelopes during July, 1909	$1.65	
Amount transferred to secretary Mississippi River Commission (in payment for coal)	1,787.94	
Amount transferred to allotment for Plant and Hopefield Bend (E. D. 15927/265)	20,000.00	
June 30, 1910, amount expended during fiscal year	27,258.77	
		49,04
July 1, 1910, balance unexpended		95
July 1, 1910, outstanding liabilities		95

SURVEYS, FIRST AND SECOND DISTRICTS.

July 1, 1909, balance unexpended		$1,98
Amount allotted from appropriation for improving Mississippi River (sundry civil act), approved March 4, 1909		2,50
		4,48
June 30, 1910, amount expended during fiscal year		4,07
July 1, 1910, balance unexpended		41
July 1, 1910, outstanding liabilities		21
July 1, 1910, balance available		20

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PLANT, FIRST AND SECOND DISTRICTS.

July 1, 1909, balance unexpended		$22.74
Amount allotted from appropriation for improving Mississippi River (sundry civil act), approved March 4, 1909		60,000.00
July 19, 1909, received from sale of steamer *Unique* and outfit		300.00
Amount received by Treasury settlement No. 10768, being amount transferred from appropriation for preservation and maintenance of river and harbor works (Arkansas River at Pine Bluff, Ark.) on account towing barges		316.41
Amount received by transfer from allotment for White River levee district (E. D. 15927/265)		10,000.00
September 9, 1909, amount refunded on account overpayment in voucher 19, June, 1909		.18
October 18, 1909, amount refunded on account overpayment in voucher 48, June, 1909		.15
		70,639.48
Amount transferred to appropriation for improving Mississippi River from mouth of Ohio River to Minneapolis, Minn. (between mouths of Ohio and Missouri rivers) for rent of plant	$52.50	
Amount transferred to appropriation for removing obstructions in Mississippi, Atchafalaya and Old rivers, in payment for coal	8.80	
June 30, 1910, amount expended during fiscal year	68,299.91	
		68,361.21
July 1, 1910, balance unexpended		2,278.27
July 1, 1910, outstanding liabilities		2,278.27

MISCELLANEOUS.

August 2, 1909, amount received from the Chicago, Rock Island and Pacific Railroad Company for rent of government pile driver	$55.00
September 27, 1909, amount received from the Lee Line steamers for towing the steamer *Georgia Lee* from Paducah, Ky., to Memphis, Tenn	134.34
February 1, 1910, amount received from the Yazoo and Mississippi Valley Railroad Company for rent of government pile driver	75.00
February 24, 1910, amount received from the Union Sand and Material Company for rent of government pile driver	25.00
March 21, 1910, amount received from H. I. Crandall & Son Company for rent of government hoisting engine	134.16
April 28, 1910, amount received from the Yazoo and Mississippi Valley Railroad Company for rent of government pile driver	190.00
	613.50
August 2, 1909, amount deposited to credit Treasurer United States for rent of government pile driver	55.00
September 27, 1909, amount deposited to credit Treasurer United States for towing steamer *Georgia Lee*	134.34
February 1, 1910, amount deposited to credit Treasurer United States for rent of government pile driver	75.00
February 24, 1910, amount deposited to credit Treasurer United States for rent of government pile driver	25.00
March 2, 1910, amount deposited to credit Treasurer United States for rent of government hoisting engine	134.16
April 28, 1910, amount deposited to credit Treasurer United States for rent of government pile driver	190.00
	613.50

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Abstract of contracts in force June 30, 1910, Mississippi River Commission, first and second districts.

Names of contractors.	Amount and character of work.	Rate.	Date of approval.	Date of beginning work.	Date of expiration of contract.
The West Memphis Packet Co.	Rent of river front opposite Memphis, Tenn., 3.72 acres.	$20 per acre per year.	Lease.....	Mar. 1,1910	June 30,1910
Wm. M. Randolph.	Rent of river front opposite Memphis, Tenn., 0.87 acres.	.....do.....	.....do.....	Feb. 1,1910	Do.
Chas. H. Boyle.....	Rent of river front at Memphis, Tenn.	$60 per year...	.....do.....	Apr. 1,1910	Mar. 31,1911
G. W. Fisher.....	.....do.....	.....do	.....do.....	.....do.....	Do.
Upper St. Francis levee district:					
P. H. Rogers...	100,000 cubic yards levee work, station $\frac{8}{8}$ to $\frac{1}{1}$.	15.36 cents per cubic yard.			
Do.....	1 acre light grubbing..	$100 per acre..	July 20,1909	July 17,1909	Feb. 1,1910.a
Do.....	105,000 cubic yards levee work, station $\frac{1}{1}$ to $\frac{2}{2}$.	15.36 cents per cubic yard.			
Do.....	6 acres light grubbing.	$150 per acre..			
Chas. W. Little.	90,000 cubic yards levee work, station $\frac{2}{2}$ to $\frac{3}{3}$.	16.24 cents per cubic yard.	Sept. 1,1909	Nov. 3,1909	Dec. 1,1910
Do.....	1 acre light grubbing..	$100 per acre..			
Roach & Stansell.	35,000 cubic yards levee work, station $\frac{3}{3}$ to $\frac{4}{4}$.	17.9 cents per cubic yard.	Nov. 26,1909	June 13,1910	Dec. 31,1910
Do.....	2 acres light grubbing.	$60 per acre...			
Realfoot levee district:					
W. L. Mosby...	35,000 cubic yards levee work, station $\frac{1}{1}$ to $\frac{2}{2}$.	24.75 cents per cubic yard.	Dec. 18,1909	Feb. 10,1910	Mar. 1,1910.a
Do.....	2 acres grubbing.....	$150 per acre..			
Lower St. Francis levee district:					
Roach & Stansell.	61,000 cubic yards levee work, station $\frac{2}{2}$ to $\frac{3}{3}$.	17.7 cents per cubic yard.	Feb. 2,1910	May 16,1910	Dec. 31,1910
Do.....	2 acres grubbing.....	$60 per acre...			
E. F. Wall, jr., and Phil. J. Howard.	16,000 cubic yards riprap stone and 2,000 cubic yards spalls.	72½ cents per cubic yard.	Emergency contract.	June 10,1910	60 days after date of notification to begin work.
Ed. J. Howard.....	Repairs to U. S. steamer Minnetonka.	Prices bid on various items of labor and material.	.....do.....	June 8,1910	42 days after delivery of boat at the contractor's yards at Mound City, Ill.

a Time limit waived.

APPENDIX 3.

REPORT OF CAPT. CLARKE S. SMITH, CORPS OF ENGINEERS, ON OPERATIONS IN THE THIRD DISTRICT.

MISSISSIPPI RIVER COMMISSION, THIRD DISTRICT,
Vicksburg, Miss., May 31, 1910.

COLONEL: I have the honor to submit the following report of operations in the third district, improving Mississippi River, for the year ending May 31, 1910.

The third district on the east side of the Mississippi River extends from the Coahoma-Bolivar county line (365 L.) to the latitude of Warrenton, Miss. (606 L.), and on the west side of Mississippi River from Red Fork, Ark., along the right bank of Arkansas River to its mouth; thence along the right bank of the Mississippi River to the latitude of Warrenton. The work on this section of the river includes bank revetment at Panther Forest, Leland Neck, and Vau-

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cluse, Ark.; Lake Bolivar Front, Ashbrook Neck, Greenville, Longwood, and Fitlers Bend, Miss.; Lake Providence, Louisiana Bend, Delta Point, and Reid-Bedford Bend, La.; and at Red Fork, Ark., on the Arkansas River, and levee construction in the Lower Yazoo (Miss.) and Upper Tensas (La. and Ark.) levee districts.

PART 1.—CHANNEL WORK.

Lake Bolivar Front, Miss. (*417 L.*).—(For description and previous history see Report Chief of Engineers, 1903, Supplement, p. 220, current annual report of the Mississippi River Commission, and map No. 1, herewith.) The rate of erosion along the front of Island 76 has gradually decreased during the past two seasons, resulting in a more direct attack by the main current of the river on the bank about the middle of the existing revetment. This resulted in undermining the shore mats from stations 16 to 22 and in destroying the upper bank slope. This defect was rectified by the construction of three shore mats aggregating 800 feet in length and containing 1,500 squares. These mats averaged about 175 feet in width. The upper bank was then regraded and repaved along this stretch. The reenforcing of the old mattress work was continued farther upstream to station 2 by constructing a mat of standard width 515 feet long to protect the head of the revetment.

The hydraulic grader was transferred from Leland Neck November 26, and it was followed by the main working force December 7, 1909. The repairs were finished January 31, 1910, and part of the force transferred to Red Fork, Ark., to make repairs to that revetment.

An extension of this revetment from the lower end is necessary to make this improvement permanent.

The cost of these repairs was $35,046.94. (For details of work done, cost, etc., see statement No. 2 herewith.)

Ashbrook Neck, Miss. (*446 L.*).—(For description and previous history see Report Chief of Engineers, 1903, Supplement, p. 220, current annual report of the Mississippi River Commission, and map No. 2, herewith.) The only repairs made were the construction of two small pocket mats, one between stations 5 and 6, the other between stations 12 and 13, and repaving the upper slope. It may be necessary to continue the reenforcing of the old mattress work down to cover the old revetment from station 4 to station 15 the coming season. An extension of the revetment a considerable distance below the original work as a further protection to the upper side of the neck may also be essential.

The party arrived from Panther Forest January 10, completed the repairs January 19, and returned to Panther Forest to put in a shore mat to protect the lower end of that revetment, where a cave had recently taken place.

The cost of these repairs was $2,973.59. (For details of work done, cost, etc., see statement No. 3 herewith.)

Panther Forest, Ark. (*452 R.*).—(For description see current annual report of the Mississippi River Commission and map No. 3 herewith.) The party arrived from Greenville January 9, 1910, and after repairing some small defects in the upper bank was moved to Ashbrook Neck January 10. A sudden settlement of the bank occurred at the lower end of the revetment January 3. As it was impracticable to make repairs until the standing trees and snags had been removed, which had settled down with the bank, the party was moved to Ashbrook Neck, awaiting the arrival of a snag boat, and afterwards returned and constructed a mat 301 by 192 feet in front of this pocket to prevent any further injury to the lower end of the revetment. To provide for an extension of the revetment the coming season the bank was cleared of standing timber for a distance of 1,000 feet above and below the existing revetment and for a distance of 100 feet back from the edge of the river, as the bank was caving rapidly and these trees would have to be removed by a snag boat before the mat work could be done. The surplus stone (511.5 cubic yards) was unloaded on the bank for future use. After finishing the work the party returned to Greenville February 17 and was disbanded.

The cost of the work was $8,785.56. (For details of work done, cost, etc., see statement No. 4, herewith.)

Leland Neck, Ark. (*471 R.*).—(For description see current annual report of the Mississippi River Commission and map No. 4, herewith.) The project was the construction of 3,000 linear feet of new revetment on the upper side of the neck, stations 0 to 30, at the narrowest part to prevent further caving and as a protection to the spur levee.

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The bank was cleared along its entire length of a dense growth of willow and a number of large drift logs before grading was begun.

Three channel mats of the full width of 265 feet were constructed, 900, 1,1 and 1,100 feet long, a total length of 3,150 linear feet, covering 3,100 linear f of bank, aggregating 8,340 squares.

Twelve connecting or shore mats, of lengths varying from 175 to 265 feet an average width of 58 feet, containing 1,480 squares, were built to connect inner edge of the channel mats with the upper bank paving. The upper sl at both ends of the work was covered with a brush revetment overlaid w stone as an additional precaution against injury to the ends of the revetm from caving.

On the whole the work was done under favorable conditions, a moderat current velocity of 4 feet a second, average depth of water of 60 feet, and good supply of labor. Some little delay was experienced on account of t inadequate supply of brush; otherwise all conditions were favorable.

Grading was begun September 8 and finished October 28, the grader work thirty-eight days, making an average rate of 84 feet a day, and costing, incl ing dressing the slope by hand, $1.33 a linear foot.

Three thousand five hundred squares of riprap were laid on the upper sl 6 to 10 inches deep, with the spaces between the larger stones filled in w spalls. The cost of this paving was $8.49 a square.

Small levees were thrown up along the top of the bank, drainage ditches c and outlets paved over slope for the discharge of storm water.

The party arrived on August 24 and finished work December 6. The pa was then moved to Lake Bolivar revetment. The cost of the completed w was $112,165.49, or $36.18 per linear foot. (For details of work done, cost, e see statement No. 5, herewith.)

In order to complete the protection of the neck an extension of the revetme both above and below of at least 1,000 linear feet will be required.

Greenville Harbor, Miss. (*478 L.*).—(For description and previous history s Report Chief of Engineers, 1903, Supplement, p. 221, current annual report the Mississippi River Commission, and map No. 5, herewith.) The only brea shown in the revetment after the high water was at the upper end, station 101 to 107, where the upper slope had been undermined by eddy action an destroyed. The stone was removed from the injured slope, the bank regrade in front of the defect, and repaved. Additional stone was placed on the slo the entire length of the revetment where necessary to cover up any defe and the drainage ditches opened.

This work was done November 1–20 by a part of the Leland Neck revetme force while that work was in progress. The cost of these repairs was $3,824.1

After the annual survey of the revetments was finished an examination of th sections showed the necessity of strengthening the subaqueous revetment nea station 66, near the angle of the main levee, which is only 50 feet from the to of the bank at this point. To accomplish this a channel mat 741 by 253 fee containing 1,875 squares, was constructed from stations 64 to 71 to reenforc the original revetment which was constructed in 1894—sixteen years ago The upper bank slope showed no breaks.

The cost of these repairs was $14,168.04, or $7.55+ for each square of mat

Work was begun December 17, 1909, and finished January 8, 1910, when the party was moved to Panther Forest.

The total cost of repairs made to the revetment during the season was $17,992.21. (For details of work done, cost, etc., see statement No. 6, herewith.)

Vaucluse, Ark. (*487 R.*).—(For description see current annual report of the Mississippi River Commission.) The revetment at this point, protecting about 2,000 linear feet of the bank immediately above what is known as the Whiskey Chute levee, which crosses the old bed of Lake Chicot, passed the high water in good condition, except that the eddy action due to recession of the bank immediately below the revetment undermined and destroyed about 100 feet of the upper bank slope; otherwise the revetment is in good condition. The upper part is covered with from 2 to 15 feet of deposit. It will be necessary in order to complete the improvement to extend the revetment at each end.

No repairs were made during the season.

Longwood, Miss. (*500 L.*).—(For description and previous history see Report Chief of Engineers, 1905, Supplement, p. 198, and current annual report of the Mississippi River Commission.) The conditions of this revetment, so far as a further extension is concerned, are about the same as last season. No repairs are needed, as the revetment is protected by the sand bar in front.

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Louisiana Bend, La. (522 R.).—(For description and previous history see Report Chief of Engineers, 1903, Supplement, p. 221, and current annual report of the Mississippi River Commission.) No change of importance has taken place during the past season, no repairs were made, and no repairs or extensions seem to be necessary.

Lake Providence, La. (540 R.).—(For description and previous history see Report Chief of Engineers, 1903, Supplement, p. 222, and current annual report of the Mississippi River Commission.) This revetment required but slight repairs. A small force of day laborers was employed November 18–20 in making slight repairs to the upper bank paving near the lower end of the revetment. The stone was readjusted on about 70 squares of paving, at a cost of $130.28.

Fitlers Bend, Miss. (550 L.).—(For description see current annual report of the Mississippi River Commission and map No. 6, herewith.) An extension of 1,000 feet was made to this revetment at the upper end by the construction of a channel mat, stations 8 to 18+50, 1,021 by 253 feet, containing 2,583 squares and four small connecting mats aggregating 961 squares. At the upper end of the revetment the upper slope for a length of 100 feet was revetted with brush covered with a layer of stone as a further protection. The revetment is now about 3,000 linear feet in length, stations 8 to 40, and is all in good condition except 150 feet of the upper bank slope, which was undermined after the high water by eddy action caused by the caving back of the unprotected bank immediately below the lower end of the revetment.

The total cost of the revetment constructed was $34,475.45, or $33.76 a linear foot. (For details of work done, cost, etc., see statement No. 8, herewith.)

The party arrived from Reid-Bedford November 4, 1909, the work was finished December 14, and the party moved to Greenville Harbor.

Delta Point, La. (598 R.).—(For description and previous history see Report Chief of Engineers, 1903, Supplement, p. 223.) The conditions remain about the same as last season. No work of any magnitude to the existing revetment appears necessary, but there are some places on the upper bank slope that need additional stone. These necessary repairs should be made the coming season in order to keep the revetment intact.

Reid-Bedford Bend, La. (603 R.).—(See current annual report of the Mississippi River Commission, and map No. 7, herewith.) The revetment built the previous season passed through the high water with but slight damage, in fact, the greater part of the revetment above station 50 was covered with sediment from 1 to 10 feet deep. Extensive caving had taken place along the entire bend above the work, which if allowed to continue will necessitate the building of a new levee. The revetment was extended upstream, stations 25 to 35, by the construction of a mat 961 by 253 feet, containing 2,431 squares, and four shore mats connecting the main mattress with the upper bank work, containing 579 squares. A shore mat 143 by 242 feet was built between stations 50 and 52+50, containing 346 squares, to cover a break in the old revetment, and the upper slope regraded and repaved; besides this work a large amount of ditching was done.

This is perhaps one of the most difficult places to revet in the entire district on account of the great velocity of the current, which was 9 feet a second or 6 miles an hour, when the mat was sunk. The bank being composed of soft, sticky deposit full of cypress stumps, the grading was very slow and expensive and could not be done until after the main mat was sunk, on account of the continued sliding in of the bank. These conditions necessitated much slower progress than ordinarily and added materially to the cost of the work. A very severe storm occurred September 21, uprooting some of the trees to which the mat was fastened, upsetting one barge of stone and the line barge.

The total cost of the work, including repairs to the old work amounting to $4,213.86, was $50,426.49. After deducting costs properly charged to repairs of old work, this revetment cost $48.09 a linear foot. (For details of work done, cost, etc., see statement No. 9, herewith.)

The work was begun September 1 and finished November 2, 1909, and the party moved to Fitlers Bend, Miss.

An extension of the revetment upstream the present season will be necessary to protect the controlling levee, as rapid caving is taking place in the bank above.

Red Fork, Arkansas River.—(See current annual report of the Mississippi River Commission.)—The revetment at this point is about 1,200 feet in length, built primarily to protect the salient of the main levee which was threatened by

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the rapidly caving bank. During the last high water the revetment suffered but little damage and required but a small amount of repairs. After the main revetment work was finished at Bolivar at the close of the season the party on its way to the quarry made such repairs as could be done at the high stage of water. These consisted of the readjustment of the stone along the upper edge and filling up a depression across the point which had scoured out during the preceding high water. The party arrived on February 3, completed the work February 4, and then proceeded to the quarry.

The cost of these repairs was $942.03. (See statement No. 1, herewith.)

On the whole, the revetments in the district are in good condition, and with the extensions proposed to be made the present season several of them will require nothing more than slight annual repairs for several years in order to maintain them.

STONE.

Loading stone.—Loading stone from the reserve at Greenville, Miss., for use on revetments was begun October 12, 1908. Two foremen and a force averaging 60 men and 10 teams were employed; labor, $1.25 to $1.50 and teams $2.75 to $3 a day. Two carpenters at $3.60 a day were engaged in calking and repairing the barges used in the service. Loading was discontinued February 6, 1909.

Below is given a detailed statement of the stone loaded and the cost of the same.

Month.	Cubic yards.	Labor.	Teams.	Miscellaneous.	Care and repairs.	Total
1908.						
October	3,851.3	$1,039.12	$338.88	$756.65	$416.47	$2,551.12
November	8,994.2	2,244.90	790.60	13.75	261.08	3,310.33
December	8,324.5	1,870.00	613.81	.....	432.54	2,916.35
1909.						
January	8,059.8	1,954.03	640.64	43.50	481.65	3,119.82
February	2,218.0	312.88	157.31	.....	13.90	484.09
Total	31,447.8	7,420.93	2,541.24	813.90	1,605.64	12,381.71

Cost per cubic yard for—

Labor	$0.2360—
Teams	.0808+
Miscellaneous	.0259—
Care and repairs	.0510+
Total	.3937+

Quarrying stone.—A small force began work at the quarry January 22, breaking and banking stone that had been blasted down from the ledges the previous season after towing had been suspended on account of lack of water in Little Red River. This force was materially increased February 16, after the revetment season had closed.

From February 15 to June 6 (one hundred and twelve days) there was a boating stage in Little Red River. From February 26, the time of arrival of the first towboat at the quarry, until June 6 (one hundred and one days), 26,725.4 cubic yards of stone were loaded on barges at the quarry, 7,080.8 cubic yards towed to Vicksburg for revetting the inside of the levee across Lake Centennial, and 19,644.6 cubic yards towed to Greenville, Miss. Of this last amount, 12,279.1 cubic yards were unloaded on the bank as reserve, and 7,365.5 cubic yards were held on barges to save the expense of rehandling.

After the close of navigation, June 6, a small force was retained at the quarry drilling, cleaning the quarry, breaking, and banking stone for next season's work.

At the end of the season approximately 7,275 cubic yards of stone had been broken and piled ready for loading on barges.

Work at the quarry was suspended for the season July 12 and the force disbanded.

Conditions were favorable and labor plentiful, except toward the end of the season, when it became necessary to import men from Memphis and Little Rock. The boating stage was about three weeks less than that of the preced-

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ing year when it extended from February 5 to June 20 (one hundred and thirty-six days).

The cost of the stone quarried, loaded on barges, and towed to Greenville was about 14 cents a cubic yard less than last year.

The quarry has been extended about 300 feet downstream so as to give a longer face with the view of employing a much larger working force and obtaining a greater output next year.

The new hydraulic grader was operated twelve days in washing the earth, débris, and loose stone from the ledges, moving approximately 7,500 cubic yards of material at a cost of 9 cents a cubic yard, leaving the ledges ready for working. About 200 feet of the lower bench has been drilled.

The following is a statement of this work:

Classification.	Cubic yards.	Cost.	Cost per yard.
Stripping*	42,000	$7,917.61	$0.1885+
Drilling	30,000	7,254.48	.2418+
Blasting	30,000	2,422.05	.0807+
Breaking	33,000	7,732.59	.2343+
Loading*	34,000	10,961.13	.3224—
Total	.....	36,287.86	1.0677

* Extending quarry included in stripping; banking stone included in loading.

	Cubic yards.
Stone piled at quarry	7,274.6
Stone loaded on barges	26,725.4
	34,000.0

Towing stone.—The towboat *H. St. L. Coppee*, after the revetment work at Reid-Bedford was finished, was put in service towing stone, leaving Vicksburg February 20 and arriving at the quarry with the first tow consisting of 5 empty barges and a loading barge February 26. The boat continued in service until May 9, when it was laid up for necessary repairs. The towboat *Arthur Hider* was put into the service March 7, after the revetment work at Red Fork had been finished, arriving at the quarry March 14 with quarter boat, hydraulic grader, and four empties, and continued towing until the end of the season, June 13, when the boat was laid up at Vicksburg. Altogether 69 barges were loaded at the quarry. Of these 51 were towed to Greenville and 18 to the levee crossing Lake Centennial at Vicksburg.

The following statement gives the cost of the various items of towing:

Month.	Yards towed.	Pay roll.	Subsistence.	Material, etc.	Total.
1909.					
February	.....	$639.29	$137.45	$511.18	$1,287.92
March	7,197.1	2,004.40	465.29	2,354.86	4,824.55
April	6,694.4	2,214.31	621.99	2,833.81	5,670.11
May	9,396.5	1,678.25	483.73	1,554.21	3,716.19
June	3,434.4	587.94	139.01	317.12	1,044.07
Total	26,725.4	7,124.19	1,847.47	7,571.18	16,542.84

Cost per unit statement.

	Per day.	Per yard.
Pay roll	$52.00	$0.267—
Subsistence	13.48	.069+
Material, etc	55.27	.283+
Total	120.75	.619—

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Unloading stone.—This work was begun March 11, 1909, and continued until June 15, 1909. One foreman and an average number of 45 laborers were employed. The price paid for labor was $1.25 to $1.50 per day. The stone received was from the government quarry, and was unloaded from barges to the reserve at Greenville, Miss.

The following is a statement of this work, showing number of yards unloaded and cost of same:

Month.	Cubic yards.	Labor.	Sundries.	Total.
1909.				
March	6,447.5	$1,237.22	$1.20	$1,238.4
April	749.6	165.91	63.49	229.4
May	3,159.1	681.57	.....	681.5
June	1,922.9	597.72	.....	597.7
Total	12,279.1	2,682.42	64.69	2,747.

Cost per cubic yard for—

Labor	$0.2185–
Sundries	.0052–
Total	.2237–

Summary of cost.

Cost per cubic yard:

To quarry	$1.067
To tow (Greenville)[a]	.567
Unloaded	.225
Total	1.859
Quarry to Greenville, 19,644.6 cubic yards, at $0.5673+	$11,145.08
Quarry to Vicksburg, 7,080.8 cubic yards, at $0.7623+	5,397.73
26,725.4 cubic yards, at $0.619—	16,542.81

Loading stone.—Loading stone from the reserve at Greenville, Miss., for use on the revetments was begun September 29, 1909. Two foremen and a force averaging 40 men and 10 teams were employed: Labor, $1.25, and teams, $3 a day. Two carpenters, at $3.60 a day, were kept constantly employed in calking and repairing the barges used in towing stone for the different revetment parties. The cost of these repairs is included in the cost of labor for loading.

Sixty-five cars containing 3,016.9 cubic yards of stone were purchased from the F. W. Katterjohn Construction Company, of Paducah, Ky., and delivered at the reserve for $2 a cubic yard. The cost of unloading this stone from the cars was 3 cents a cubic yard.

It was necessary at the close of the season to dig up from the bottom of the stone pile under the railroad trestle about 2,000 cubic yards of stone which had been there for several years. The bottom of the pile had been hauled over for several seasons, and the spaces between the stone were filled in with sediment and débris from continual overflows, making it necessary practically to quarry this stone. This extra work added about $1,000 to the cost of loading and increased the cost about 4 cents a cubic yard.

Sixty-seven barges were loaded. This took all the reserve stone.

Barge *No. 087*, loaded with 406.6 cubic yards of stone, was swamped and sunk during a storm which occurred on the night of September 21, 1909. An attempt was made to raise the barge, but before the bulkhead which was being built around the barge was finished the barge broke in two.

Loading was discontinued January 20, 1910. Below is given a detailed statement of the amount of stone loaded and cost. This cost includes care and repairs to the barges while the work was being done.

[a] Cost of towing.

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Month.	Cubic yards.	Labor.	Teams.	Property.	Material.	Sundries.	Total.
1909.							
September		$22.19					$22.19
October	7,284.1	1,436.87	$657.66	$387.35	$143.15	$47.55	2,672.58
November	9,441.0	1,770.72	911.75	.10	125.72	65.15	2,873.44
December	5,837.0	1,581.37	622.13	.....	138.68	17.50	2,359.68
1910.							
January	1,512.3	591.81	234.75	.....	14.10	.....	840.66
Total	24,074.4	5,402.96	2,426.29	387.45	421.65	130.20	8,768.55

Cost per yard for—

Labor	$0.2244+
Teams	.1008—
Property	.0161—
Material	.0175+
Sundries	.0054+
Total	.3642+

Work at the quarry began January 24, 1910, with a small force. This was increased February 7 by part of the force employed on revetment work after that work had been completed.

The first tow of empties arrived at the quarry March 4. Between March 4 and May 1 there were only forty-eight days of towboat stage in Little Red River, during which time 11,117 tons of stone have been loaded on barges, leaving about 6,000 tons on the yard ready for shipment. The top ledges of the quarry have been stripped the entire length for a width of 30 feet, an extension of the quarry made at the lower end, and the floor cleaned up. About 4,000 tons of stone have been drilled ready for blasting in addition.

Of the 11,117 tons of stone loaded, 1,924.2 tons were transferred to the Vicksburg district for use on locks and dams in Ouachita River, and the remainder, 9,192.8 tons, delivered at Greenville, Miss., as a reserve for next season's work. Part of this, 4,295.3 tons, was unloaded on the bank and the remainder held on barges.

The towing season has been unusually short, and the low stage of water both in White and Little Red rivers, together with the lack of barges has restricted the available output, when compared with that of the past two seasons, one-half. This deficiency will be supplied by contract.

The entire reserve stone at Greenville was used, supplemented by 3,017 tons of stone delivered by rail at the close of the season.

The reserve stone at the close of the season at Panther Forest was 511.5 cubic yards, and at Red Fork, 525 cubic yards.

PLANT.

The plant available for revetment work at present consists of the following:

2 towboats.
1 inspection and survey boat.
1 tug.
2 hydraulic graders.
6 mattress boats.
4 mooring barges.
11 material barges, first class.
8 material barges, second class.
9 material barges, third class.
2 line barges.
1 barge fitted for loading stone.
2 field office quarter boats.
8 laborers' quarter boats.
22 skiffs.

The repair outfit is composed of:

1 office quarter boat.
1 machine shop.
1 carpenter shop.
1 dry dock.
5 calking flats.
1 gasoline yawl.

In addition to the foregoing there is now being constructed at the Rock Island district boat yards the following new plant:

2 mooring barges.
6 material barges.
1 field office quarter boat.
1 line barge.

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The barges are built of Oregon fir treated by dipping in a bath of creosote.

A steel dock and four steel barges are being built by the American Bridge Company under contract.

It is expected that all the plant under construction at the Rock Island district boat yards and the four steel barges being built by the American Bridge Company will be available for use during the latter half of 1910.

The use of the turbine pump for hydraulic grading during the season has given satisfactory results.

The cost of care of plant for the year was $8,988.40. The average number of employees engaged in care and repairs to plant during the year was 4. (For details of work done, cost, etc., see statement No. 11, herewith.)

The plant when the repairs contemplated are finished will be in a fairly good condition for the coming season's work, and with the new plant under construction will be sufficient for three independent working parties.

A list of the floating plant of the district is given in statement No. 10, herewith.

Operations under the heads Channel Work, Stone, and Plant were under the immediate supervision of Mr. Arthur Hider, assistant engineer. The foregoing report and statements appended thereto embody the essential features of his detailed reports, which have been filed at this office.

PART 2.—SURVEYS.

The season's work contemplated the usual annual hydrographic surveys covering all existing and projected revetment work and all reaches where important levees or interests were threatened by active caving banks. The regular annual allotment of $5,000 was made to cover the cost.

The usual annual survey was also made of the Yazoo Diversion Canal and Vicksburg Harbor, using the organization of the third district, but charging the cost of the survey to the allotment for "Yazoo River at mouth."

The survey party was organized for field work October 11, 1909, and work was begun on the Yazoo Diversion Canal survey. The steamer *Columbia*, of the Vicksburg engineer district, was transferred to the party partially in commission on October 13. The survey of the diversion canal was completed on the 15th, and the party proceeded to Reid-Bedford the same day. The revetment and reach surveys were made in order, working upstream, and the reach surveys where no revetment had been placed, were made on the way down the river after completing the revetment surveys. All field work was completed and the party disbanded December 16. The steamer *Columbia* was transferred to the Vicksburg district in commission the same day.

The surveys made were of three general kinds, as follows: Revetment, revetment and reach combined, and extended reach and shore-line surveys. The first includes laying out and retracing base line, and marking off same into stations of 100 and 200 feet, at which points ranges are set along the full length of the revetment. The ranges are sounded across the width of the revetment and beyond, and at intervals of about 2,000 feet they are sounded across the entire width of the river. The second includes, in addition to the revetment survey as above, a reach survey extending beyond the limits of the revetment. The third includes a shore line located along the full reach surveyed, and at intervals of about 2,000 feet ranges are laid off and sounded the entire width of the river. The existing levee lines also are retraced and other prominent features are located where necessary.

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Following is a statement in detail showing work done, together with costs, etc.:

Locality.	Miles below Cairo.	Extent of survey.	Ranges sounded.		Time consumed.
			Across river.	Revetment.	
		Miles.			*Days.*
Revetment surveys:					
Greenville Harbor	477–479	2.80	9	132	6½
Lake Providence	540–542	2.34	10	49	2½
Total		5.14	19	181	9
Revetment and reach surveys:					
Red Fork Bend	Ark. R.	1.9	7	13	1½
Bolivar Front	413–418	2.5	4	23	1½
Ashbrook Neck	445–447	3.5	10	73	3½
Panther Forest	450–452	5.0	6	19	2
Leland Neck	469–471	3.5	5	24	2
Vaucluse	485–490	3.1	8	19	2
Longwood	500–502	2.9	9	28	2½
Louisiana Bend	512–514	2.0	3	24	1½
Fitler Bend	550–553	4.1	16	30	2
Delta Point	597–599	2.1	6	46	3½
Reid-Bedford	603–607	7.4	9	47	4½
Total		38.0	83	346	27
Reach and shore-line surveys:					
Matthews Bend	506–510	4.0	7	.....	1
Stack Island Chute	539	4.3	13	.....	2
Total		8.3	20	.....	3
Yazoo Diversion Canal survey	.....	.....	41	.....	4

Statement of field cost.

Pay rolls	$2,192.08
Subsistence	524.26
Coal	346.80
Miscellaneous supplies	88.69
	3,151.83

Distribution of time.

	Number.	Per cent.
Days party actually worked	43	64
Days lost account Sundays, holidays, and rain	10.5	16
Days lost moving	13.5	20
	67	100

	1909–10.	1908–9.
Total cost per day of party in the field	$47.04	$50.36
Cost per mile of revetment surveys	124.00	151.00
Cost per mile of revetment and reach surveys	50.30	54.72
Cost per mile of reach and shore-line surveys	25.50	29.18

It will be noted that the unit costs of the survey were all less than last season. This is due mainly to prosecuting the surveys in regular order up and down stream, thus increasing the percentage of days of actual work in the field to total days out from 61 to 64, and to the employment as much as possible of men who had served the previous season.

Practically all the notes were reduced while the party was out, field sheets and comparative sections platted and sent to the office very soon after completion of the field work at each locality.

Comparison with previous surveys and discussion of results are made as follows:

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Red Fork Bend revetment and reach (Arkansas River).—The sections sounds show that the entire length of the revetment is subject to severe attack durin high stages of the river. Excepting a slight flanking at the lower end, the su vey indicated the revetment to be in good condition. The caving below th revetment continues.

Lake Bolivar revetment and reach (413–418 L.).—(See map No. 1 herewith Very little caving occurred along the front of Island 76. The revetment is no subject to the full action of the river throughout its entire length. From range "A" to 2, situated upstream from the reenforcement of 1907, the old wove mat showed evidence of further failure. A break developed while the surv was in progress, extending from range 16+50 to 18+75, but with the exceptio of this breach the reenforcement appears to be holding well. Caving below th revetment for about one-half mile continues at about an average rate of 5 feet per annum. Downstream from a point about 1,500 feet below reach rang 8 the zero contour of the bar advanced slightly, while upstream from this poi it retreated somewhat.

Ashbrook Neck revetment (445–447 L.).—(See map No. 2 herewith.) Abov the revetment the shore line continues to cave slightly. Along the revetme the soundings indicate very little change from the previous survey, althoug the work is subject to very active attack throughout its entire length. Belo the revetment the shore line continues to recede at the rate of about 80 fe per annum. The position of the zero contour of the bar has not changed muc from last year.

Panther Forest revetment and reach (450–452 R.).—(See map No. 3 her with.) Since the survey of August, 1908, about 2,200 feet of revetment wer placed which served to check the caving where the revetment was located. Th present survey indicated that the full length of the new revetment was subje to very active attack. The depths along the outer edge of the mats placed wer all increased, and the flanking action was beginning at both the upper an lower ends. Caving has continued above and below the revetment.

Upstream from range 5 the zero contour of the bar line advanced, but ther was not much change downstream from that range.

Leland Neck revetment and reach (469–471 R.).—(See map No. 4 herewith Since the survey of September, 1908, about 2,100 feet of revetment were placed as shown on the map, the mats placed extending from range 11 to 42. Th survey was made after the new mats were sunk, establishing 4,600 feet of bas line. The shore line had continued to cave at an average rate of about 10 feet per annum along the entire reach between the years 1908 and 1909. Th position of the zero contour of the bar line retreated at reach ranges 1 and 2 and advanced at range 3.

Greenville Harbor revetment (477–479 L.).—(See map No. 5 herewith. Above the revetment the survey showed continued active caving, amounting t an average recession of about 100 feet for the season. Inshore scour and evi dences of defects were noted at ranges 101, lower 25, and from 63 to 70. Th entire line of revetment is subject to the full force of the main current, bu with the exceptions noted above the soundings show the work to be in goo condition. The zero contour of the bar line retreated slightly from the upper end of the revetment to range 144; thence to range 82 it advanced, and below 82 to the lower limit of the survey it retreated.

Vaucluse revetment and reach (485–490 R.).—Since the survey of August 1908, about 2,000 feet of revetment were constructed. Along the completed revetment ranges 2 to 22, only slight changes were noted. The bank has con tinued to cave above and below the revetment. The zero contour of the bar lin retreated above the head of the revetment, and below the revetment advanced a average of 200 feet to the limit of the survey.

Longwood revetment and reach (500–502 L.).—The conditions along thi revetment are practically the same as noted last year. The fill has progressed at even a more rapid rate in front of the entire revetment. The main channe of the river has shifted farther toward the right bank. The rapid caving, com mencing about 1,500 feet below the revetment, continues at about the same rat as before. The bar opposite the revetment remains very wide and flat and varies a little above and below the elevation of the zero level.

Louisiana Bend revetment (522–524 R.).—The remaining revetment is intact Ranges 88 to 120 show very little change from last year. Above range 88 the work is covered by the Ashton bar. Below range 128 the work is noneffective and the bank is caving gradually, but does not threaten the levee there.

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Lake Providence revetment (540–542 R.).—The zero contour of the Longwood bar has continued to move downstream with great rapidity, the advance amounting to about 1 mile. Above range 98 the bar shows above the 12-foot stage on the Lake Providence gauge, and the revetment is covered by the bar down to range 50. The soundings indicate the revetment to be in good condition. There remains about 2,200 feet subject to the full force of the river. Below the revetment very little change is noted.

Fitler Bend revetment and reach (550–553 L.).—(See map No. 6, herewith.) The survey indicated rapid caving above and below the revetment with a slight flanking action at both ends of the work. The balance of the revetment seemed to be in good condition. The middle-ground formation that was indicated last year has disappeared; otherwise the position of the zero contour of the bar line remains practically unchanged. The point below the revetment is being eroded away at a rapid rate.

Delta Point revetment and reach (597–599 R.).—The shore line above the head of the revetment continues to cave at the rate of about 50 feet per annum. The soundings over the effective revetment show only slight changes from last year. The zero contour of the bar line upstream from the revetment advanced, but opposite thereto it is practically unchanged.

Reid-Bedford revetment and reach (603–607 R.).—(See map No. 7, herewith.) The survey showed rapid caving above the revetment. Below the revetment only slight caving is indicated since the November, 1908, survey. The soundings over the new revetment placed in 1908–9, ranges 34 to 48, show the work to be in good condition. Ranges 48 to 54 the soundings showed some evidences of failure above the channel mats. The extreme lower end of the revetment appears to be in good condition, with only a slight flanking action. The location of the bar line has not changed much.

Matthews Bend reach (506–510 R.).—Caving continued at a greatly reduced rate along the entire reach, ceasing almost entirely along the upper portion. The zero contour of the bar has retreated and the sections sounded show that the low-water channel has widened out, indicating less future severity in the attack against the bank. Continued caving along the lower part of the reach makes it necessary to watch the situation near the Grand Lake crossing closely during the next few years.

Stack Island chute (538–542 L.).—The surveys indicate a widening of the upstream end of the chute between ranges 1 and 5 without any noteworthy change in depth during the past two years. The cross section of the channel has therefore enlarged at these ranges. At ranges 6 to 11 the chute has enlarged principally by caving and deepening along the left bank near the levee, the greatest rate of caving being just below range 9, where it has been about 300 feet per year. The levee is about 600 feet from the bank at this place. Referring to the chute as a whole, it has enlarged its cross section and more water very probably now traverses it than heretofore.

Office drafting and mapping.—Besides the field work, finished tracings have been made of all the surveys; sections platted on new sheets, where necessary; and all the drawings for the annual report have been made. At least one draftsman has been kept busy in the above work practically continuously.

Summary of total expenditures.

Field cost of survey (73 per cent)	$3,151.83
Drafting, office expenses, etc. (27 per cent)	1,163.57
Total	4,315.40

Additional details are contained in the report of Mr. A. M. Todd, assistant engineer, which report has been filed at this office.

PART 3.—LEVEES.

Lower Yazoo levee district (365–599 L.).—(For detailed history see Report Chief of Engineers, 1905, Supplement, p. 201, and reports of the Mississippi River Commission since 1882.) The district is located in the State of Mississippi and extends from the Coahoma-Bolivar county line (365 L.) to the mouth of the Yazoo Diversion Canal at Vicksburg (599 L.). The levee is constructed downstream to a point on Eagle Lake (580 L.), and its present length is 188.4

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miles, the same as last year, no new loops having been built this year. When the levee is completed to the lower end of the district, the length of the controlling levee and area of land protected in this delta will be about as follows:

Levee district.	Length of levee.	Area protected.
	Miles.	*Square miles.*
Upper Yazoo	124	3,281
Lower Yazoo	189	3,206
Warren County	19	161
Total	332	6,648

A levee 8,800 feet long at the lower end of the district was constructed as a part of the Yazoo Diversion Canal improvement.

The following is a statement of the yardage:

	Cubic yards.
Contents of levee May 1, 1909	41, 972, 163
Added during the year by the United States	299, 386
Added during the year by the levee board	1, 449, 390
Contents May 1, 1910	43, 720, 939

Repair work, being generally a replacement of material previously lost, is not included in the yardage added during the year. Yardage of drain ditches is also omitted.

The following is a list of the unfinished contracts in force May 1, 1909—all enlargement work:

Stations.	Miles below Cairo.	Contractor, and date of contracts.
900 to 960	380	Roach & Stansell, August 7, 1908.
900 to 1000	381	Shields Bros. & Nystrom, November 30, 1908.
1570 to 1645	502	W. T. Lowrance & Co., August 7, 1908.

The two contracts dated August 7, 1908, were completed during the year, but the other contract, being let late in the season as long-time work, was not completed, and only 14 per cent of it was placed during the year.

In 1909 the commission allotted $110,000 for Lower Yazoo levees, and the following contracts were let from this allotment:

Stations.	Miles below Cairo.	Cubic yards in contract.	Time for completion.	Price per cubic yard.	Contractor.
				Cents.	
1328 to 1500	397	206,000	Mar. 1, 1910	21.85	Shields Bros. & Nystrom.
2400 to 2550	416	183,000	.....do.....	22.60	Do.
Total	.....	389,000	.....	22.25	

The above was all enlargement work.

Details of the work done during the year will be found in statement No. 12, which accompanies this report.

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The following is a statement of progress:

Stations.	Miles below Cairo.	Kind of work.	Cubic yards in contract.	Placed during year.		Placed to date.		Completed.
				Cubic yards.	Per cent.	Cubic yards.	Per cent.	
1908–9 contracts:								
900 to 950	380	Enlargement..	76,435	4,631	6	76,435	100	Oct. 14, 1909
950 to 1000	381	.....do.....	78,000	11,305	14	11,305	14	
1570 to 1645	502	.....do.....	140,765	37,695	27	140,765	100	Jan. 31, 1910
Total			295,200	53,631	44	478,752	69	
1909–10 contracts:								
1328 to 1500	397	.....do.....	206,000	159,357	77	159,357	77	
2400 to 2550	416	.....do.....	183,000	90,890	50	90,890	50	
Total			389,000	250,247	64	250,247	64	
Grand total			684,200	303,878	44	478,752	69	

The yardage placed this season is as follows:

	Cubic yards.
In the 1908–9 contracts	53,631
In the 1909–10 contracts	250,247
Total placed	303,878

REPAIRS AND MAINTENANCE.

No repairs have been made in the district by the United States this year, this work having been done by the levee board.

SURVEYS.

Levels were run over the crown of the levee on Waxhaw loop (392 L.) and from Rosedale south about about 17.5 miles (399–416 L.).

Shore lines where the river threatened to breach the levee in the near future have been surveyed at Riverton (400 L.), Stack Island (539 L.), Promised Land (547 L.), Fitlers (551 L.), Shiloh or Cottonwood (556 L.), and Albemarle Bend (568 L.). Alternate lines for new loops were located and surveyed at Riverton and Albemarle.

The flood of this season (40.6 feet on the Vicksburg gauge) was so moderate in height that there was no overflow from backwater.

BANK LINES.

Parker to Dennis (367–373 L.).—The old levee in front of the Australia loop was breached in the year 1907–8. Caving continues at a moderate rate.

Waxhaw (392–394 L.).—The caving on this front is at a rate of about 50 feet per year.

Terrene (395 L.).—The change along this front has been very slight.

Riverton (400 L.).—The caving here is at a rate of about 170 feet per year. The levee board will build a new loop here during the year 1910–11.

Bolivar (417 L.).—Reference to work here during the past season has been made.

Buck Ridge (418 L.).—The caving has been quite active, making the necessity for a new loop possible later.

Choctaw Bend (435 L.).—The river is very close to the levee at one point in this bend, but there has been very little change during the past two years.

Ashbrook Neck (477 L.).—Reference to this work has been made above.

Bachelors Bend (475–479 L.).—Reference to this work has been made above.

Warfield Point (484 L.).—The caving was so close to the levee that two new loops were built here in 1908–9, but neither of the two abandoned levees has been breached yet.

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Longwood Front (499 L.).—Caving has continued below this revetment.

Valewood Front (528 L.).—There has been very little caving on this front during the past two years. The abandoned levee was breached in 1908–9.

Stack Island (538–542 L.).—The caving is active on both sides of the chute, the greatest rate being just below range 9, where it has been about 300 feet per year. The levee is about 600 feet from the bank at this place. As a whole the chute has enlarged its cross section and very probably more water now traverses it than heretofore.

Promised Land (546–550 L.).—The caving here is very active, being at a rate of 700 feet per year immediately below where the levee leaves the river and 400 feet per year in front of the levee. The sand bar on this front is building downstream very slowly.

Fitlers (552 L.).—Reference to this work is made above.

Shiloh or Cottonwood (553–560 L.).—The caving along this front is very active. A new levee has been provided for by the levee board, to be constructed in 1910.

Albemarle Bend (567–572 L.).—The caving here has averaged 500 feet per year from 1882 to 1906 and 400 feet per year from 1906 to 1910. A new levee will be necessary this year, but one of moderate cost will have a life of only a few years at the present rate of caving.

CONDITIONS OF LEVEES AND ESTIMATE FOR FUTURE CONSTRUCTION.

The entire levee is 1.5 feet or more above the highest-known water. Compared with the grade and section prescribed by the Mississippi River Commission in 1898, there is—

	Miles.	Per cent.	Above 1903 high water.
			Feet.
Of sufficient height and section	21.1	11.0	4
Of sufficient height but insufficient section	34.3	18.3	4
Of sufficient section but insufficient height	12.7	6.7	1
Of insufficient section and height	120.3	64.0	1.1 to 2
Total	188.4	100.0	

The levee reenforced by banquette is as follows: 64 miles with grade 4 feet below the highest water, 68 miles with grade 6 feet below the highest water, 10.5 miles with grade 8 feet below the highest water, 10.8 miles with grade 12 feet below the highest water; 35.1 miles are without banquette.

The following is an approximate estimate of yardage required for the completion of the levee to the commission grade:

Items.	Above Greenville.	Below Greenville.	Total.
	Cubic yds.	*Cubic yds.*	*Cubic yds.*
Enlargement	2,463,500	4,051,600	6,515,100
Banquette	356,200	1,225,000	1,581,200
Increase of slope on exposed fronts from 1 on 3 to 1 on 4	.....	.....	1,300,000
New loops required in 1910–11, estimated to last from 8 to 25 years	.....	.....	2,500,000
Total	.....	.....	11,896,300

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LEVEE BOARD WORK.

The following is a summary of the contracts let by the levee board during the year:

Date of letting.	Kind of work.	Cubic yards.	Average price.
			Cents.
May 17, 1909	Enlargement..	831,700	21.06
January 17, 1910	.....do.....	230,000	21.83
		1,061.700	21.23
April 27, 1910	New levee.....	927,000	19.05
Total for year	.....	1,988,700	20.21

A statement (No. 14) of the work done by the levee board during the past year accompanies this report. The following summary is prepared from that statement:

Kind of work.	Cubic yards in contract.	Placed this year.	Per cent.	In place to date.	Per cent.	Cost of this year's work.	
						Amount.	Average price.
		Cubic yds.		*Cubic yds.*			*Cents.*
In force May 1, 1909	907,747	635,448	70	856,618	94	$168,511.13	26.52
1909–10 work	806,659	745,448	92	745,448	92	151,758.39	20.36
1910–11 work	1,157,000	68,494	6	68,494	6	13,524.02	19.74
	2,871,406	1,449,390	50	1,670,560	58	333,793.54	23.03
Repair work	.....	51,913	.....	51,913	.....	13,362.98	25.74
Total	.....	1,501,303	.....	1,722,473	.....	347,156.52	23.12

It should be noted that the expenditures in the statement by the levee board includes the retained percentage on work done on contracts begun prior to the beginning of the year and finished during the year and does not include the percentage retained on contracts not yet completed. In the above statement the cost of the contract work during the year, at contract prices, is given, and no retained percentage is added or deducted.

GRADES.

The grade used by the levee board in their 1909–10 work from the upper end of the district to Refuge (367–488 L.) is 4 feet, and from Fitlers to the lower end of the levee (553–573 L.) is 2.5 feet above 1903 high water. The grade of the proposed new loop at Riverton (403 L.) is 4 feet, the one at Shiloh or Cottonwood (555 L.) is 3 feet above, and the banquette at Stella (503 L.) is 6 feet below that water.

REPAIRS.

The repair work done by the levee board was by day force. The details of location and kind of work are fully given in statement No. 14, already referred to.

CARE AND PRESERVATION OF THE LEVEE.

The levee board has given very close attention to the care and preservation of the levees in keeping travel off of them and clearing the right of way of all obstructions. This work, in the main, is done by six mounted patrolmen, three above and three below Greenville. Their instructions require them to ride over the entire line every day.

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ANALYSIS OF EXPENDITURES.

The following is an analysis of the expenditures of the levee board exclusive of inspection, engineering, and administration:

	Amount.	Per cent.
Construction	$326,841.12	91.1
Repairs, including weed cutting, etc.	15,908.11	4.4
Rights of way	13,977.96	3.9
High-water protection	511.80	.1
Haul-over levee	1,371.28	.4
Total	358,605.27	100.0

The following is an analysis of the expenditures of the United States during the year:

	Amount.	Per cent.
Construction	$67,126.26	87.9
Surveys and high-water observations	3,960.00	5.2
Engineering	5,240.27	6.9
Total field expenditures	76,326.53	100.0
Charged from office	3,396.31	.....
	79,722.84	.....

The relatively high percentages of "surveys and high-water observations" and "engineering" are due in great part to the limited progress on the enlargement contracts resulting from the short period for active operations and other unfavorable conditions.

WARREN COUNTY LEVEE DISTRICT.

The board of levee commissioners for the Warren County levee district, previously organized, had no authority to levy taxes or to collect revenues until the legislature of Mississippi passed a law in March, 1910, giving it the same rights that had been given to the other levee boards.

Upper Tensas levee district (402–606 R.).—(For detailed history see Report Chief of Engineers, 1905, supplement, p. 203, and reports of the Mississippi River Commission since 1882.) The levees included in this district consist of two separate lines as follows: (1) An extension of the Arkansas River levee (right bank), below Red Fork, Ark., 17.5 miles, and (2) the Mississippi River levee, which begins on comparatively high ground on the north bank of Amos Bayou and extends in a southeasterly direction to the bank of the river about one-half mile below the mouth of Cypress Creek (426 R.); thence along the right bank to the lower limit of the third district (606 R.). Between the two lines of levee there remains a gap of 3.5 miles, which has been left on account of the nonclosure of Cypress Creek, which drains an area of 392 square miles. The length of the Mississippi River levee is 171.9 miles, of which 81.9 miles are in Arkansas and 90 miles in Louisiana. The total length of levee line is 189.4 miles, protecting about 2,500 square miles completely, and in addition 500 square miles from ordinary floods.

The following table shows new levees completed covering levees abandoned on account of caving banks:

Locality.	Miles below Cairo.	Beginning station number.	Length of—		Abandoned.
			New levee.	Old levee.	
			Feet.	*Feet.*	*Cubic yards*
Chicot Loop	431	609+70	12,030	17,199	650,000
Gaines Loop	450	1491	4,975	5,800	250,000
Cabin Teele Loop	554	3407+37	13,504	10,835	320,000
Total	.....	.....	30,509	33,834	1,220,000

The net change of length amounts to a shortening of 3,325 feet or 0.63 of a mile.

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LEVEE CONSTRUCTION BY THE UNITED STATES.

At the beginning of the period the following uncompleted contracts were in force:

Stations.	Miles below Cairo.	Kind of work.	In place May 1, 1909.	To place May 1, 1909.	Contractors.
			Cubic yards.	*Cubic yards.*	
778 to 871	Ark. R.	New levee	60,765	805	Leonard & Rogers.
871 to 916	Ark. R.	do	26,189	89,811	W. M. Bates.
360 to 390	427	Enlargement	19,944	20,056	Roach & Stansell.
560 to 620	429	do	55,706	11,254	Do.
2050 to 2155	468	do	59,902	57,098	Donovan & Daley.
3460 to 3530	506	do	58,650	46,350	O. A. Gibson.
Total			290,156	225,374	

The Mississippi River Commission allotted to this district $130,000 for the fiscal year ending June 30, 1910, for the expenditure of which proposals were opened July 1, 1909, and contracts awarded for the following work:

Stations.	Miles below Cairo.	Kind of work.	Estimated contents.	Contract price.	Contractors.
			Cubic yards.	*Cents.*	
1240 to 1360	442	Enlargement	80,000	18.49	Shields Bros. & Nystrom.
1360 to 1490	446	do	80,000	16.35	Do.
1940 to 2050	467	do	90,000	19.90	Clark & Parker.
3407 to 3428	583	New levee	90,000	21.00	Roach & Stansell.
3428 to 3448	583	do	100,000	21.00	Do.
3448 to 3473	583	do	120,000	21.00	Do.
Total			560,000		

Stations 871 to 916, Arkansas River, W. M. Bates contractor: Contract was annulled on account of failure on the part of the contractor to understake the work. The work was relet September 28 to W. T. and E. M. Lowrance at 32.7 cents per cubic yard—the estimated yardage remaining to be placed was 90,000 cubic yards. There were approximately 650,000 cubic yards of levee work let during the period, and at the prices bid the average cost amounts to 21.6 cents per cubic yard.

On account of repeated minor freshets the river remained at or above the bank-full stage and kept the pits along the levee flooded, so that work could not be started on the enlargement contracts until about the middle of August. It was September 1 before all the contracts were in good condition for work. On the latter date forces were at work on all contracts except stations 1940 to 2050 (467 R.).

The months of September, October, and November were ideal for levee work, and labor conditions were good. The progress of the levee work suffered in December and January on account of severe freezing weather, snowstorms, and frequent rains. Thus the good working season lasted practically three months. The following contracts were completed by the expiration of the contract time, March 1, 1910:

Stations.	Miles below Cairo.	Date of completion.	Stations.	Miles below Cairo.	Date of completion.
778 to 871	Ark. R.	Nov. 8, 1909	3460 to 3530	506	Jan. 4, 1910
560 to 620	429	Oct. 30, 1909	3407 to 3428	583	Mar. 1, 1910
1240 to 1360	442	Dec. 30, 1909	3428 to 3448	583	Do.
2050 to 2155	468	Nov. 10, 1909	3448 to 3473	583	Jan. 24, 1910

An extension of time was allowed on the remaining uncompleted contracts, which was necessary owing to the short working season. Stations 360 to 390 (427 R.) would possibly have been completed, but the withdrawal of the working force was permitted in order to work on the Chicot Front new levee (431 R.)

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under contract by the Tensas Basin levee board with the hope of completing the new levee in advance of the high-water period.

All levee work on enlargement contracts was suspended by February 10 on account of a freshet in the river coming just high enough to flood the pits along the levee line. During the period a total of 605,574 cubic yards of earthwork was placed, leaving 202,167 cubic yards under contract and remaining to be placed. Following is a statement showing the uncompleted contracts in force:

Stations.	Miles below Cairo.	Kind of work.	In place May 1, 1910.	Remaining to be placed.	Contractors.
			Cubic yards.	*Cubic yards.*	
871 to 916	Ark. R.	New levee	.....	90,000	W. T. & E. M. Lowrance.
360 to 390	427	Enlargement	29,253	16,747	Roach & Stansell.
1340 to 1360	442	.....do	64,671	13,329	Shields Bros. & Nystrom.
1940 to 2050	467	.....do	19,909	82,091	Clark & Parker.
Total			113,833	202,167	

A statement (No. 15) is submitted herewith showing all the contracts in force during the period, work done, together with all construction details, etc.

LEVEE BOARD CONSTRUCTION.

Practically the same conditions that influenced the progress of government contracts applied also to the state work. The only contract deserving mention in this report is the Chicot Front new levee (431 R.), the erection of which was undertaken in 1906–7 jointly by the United States and the Tensas Basin levee board. The part contracted for by the Government was completed in 1907. The part undertaken by the levee board crossed the head of an extensive and deep cypress swamp. Great difficulty has been experienced each season getting the work in condition for effective progress. All the material had to be hauled from the high ground along the north and south banks of the swamp, which necessitated an average haul of about 1,500 feet. Early in the season it was thought that by concentrating all the available wagon and grader outfits on the swamp it could be completed in advance of the high-water season. It appeared that completion was assured, when 300 feet near the south bank sunk at the base from 5 to 10 feet, and later the sink involved the levee 200 feet farther south, this subsiding from 3 to 6 feet. After a consultation by the state and government engineers it was decided it was best not to undertake the restoration of the sunken levee at once, but to wait until the dry season of the year, when it is thought the prospect will be better for the foundation involved to be more stable.

During the period the various levee boards in the district placed 814,399 cubic yards, and have contracts in force remaining to be placed for about 300,000 cubic yards. Their total expenditure for levee work amounted to $180,352, making an average price of about 22.15 cents per cubic yard. A statement (No. 16) accompanies this report, showing the levee board work in detail.

SUMMARY OF EARTH IN PLACE.

The following table shows the yardage added to the levee line, the amount lost by levees abandoned, and the net amount of yardage in place at the end of the period:

	Arkansas River levees.	Mississippi River levees in—		Total.
		Arkansas.	Louisiana.	
	Cubic yards.	*Cubic yards.*	*Cubic yards.*	*Cubic yards.*
In place May 1, 1909	2,454,397	16,211,603	18,711,765	37,377,765
Added during year:				
By United States	.....	293,539	312,035	605,574
By levee boards	.....	386,087	428,312	814,399
Total	2,454,397	16,891,229	19,452,112	38,797,738
Lost by levees abandoned	.....	900,000	320,000	1,220,000
Net, May 1, 1910	2,454,397	15,991,229	19,132,112	37,577,738

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The United States has constructed altogether in this district since 1882, 26,964,533 cubic yards, and of the total yardage in the controlling levee line about 60 per cent has been built by the United States and about 40 per cent by the levee boards.

ESTIMATE TO COMMISSION GRADE.

Following is a revised estimate to complete the levees to commission grade and section as adopted by the commission in 1898. This estimate is corrected each year by deducting yardage of all work completed and under contract:

	Enlargement.	Banquette.	New levees and extensions.	Total.
	Cubic yards.	*Cubic yards.*	*Cubic yards.*	*Cubic yards.*
Arkansas River levee	1,100,000	516,000	.....	1,616,000
Do	.....	84,000	600,000	684,000
Levees in Arkansas	1,680,000	1,804,000	300,000	3,784,000
Levees in Louisiana	2,100,000	2,041,000	500,000	4,641,000
Total	4,780,000	4,445,000	1,400,000	10,725,000

The estimated yardage required to complete the levees to commission grade, including work under contract but not completed, and exclusive of probable new levees, amounts approximately to 9,800,000 cubic yards.

REPAIRS AND MAINTENANCE.

Owing to the late season when the freshets finally subsided, it was decided not to undertake any extensive repair work, and as far as possible in the future to leave the minor repairs to the local levee boards. The only repair work undertaken was as follows:

Locality.	Miles below Cairo.	Work done.	Cost.
Station 1749	451	Repairs to defective foundation, sand boils and sloughing slope of banquette excavated and refilled with good material.	$550.00
Leland Dike	470	Minor repairs to end	446.57
Total	.....	.....	996.57

DRAINAGE OF BORROW PITS.

The following canal ditches were cut to drain the levee borrow pits back of revetment reaches, the cost of the work being charged to the appropriation for each revetment benefited; the inspection and execution of the work was under the local levee inspectors:

Locality.	Miles below Cairo.	Stations.	Excavation.	Price per cubic yard.	Total cost.
			Cubic yards.	*Cents.*	
Panther Forest	451	1740	3,837	17.19	$659.58
Vanclues	487	2540	3,016	18.75	565.50
Reid-Bedford	604	4542	8,180	20.00	1,636.00
Total	.....	.....	15,033	.....	2,861.08

LOCAL SURVEYS AND OBSERVATIONS.

The usual local caving-bank observations were made from time to time. During the months of March and April the local inspectors in the field were engaged on new loop, shore line, and level over top of levee surveys. Following is a statement of work done.

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Stations.	Miles below Cairo.	Number of miles in survey.	Kind of survey.
1740 to 2562	450–485	15.7	Levels over top of levee.
2562 to 2950	505–515	7.4	Do.
2220 to 2304	559–560	1.9	New levee and shore line.
3400 to 4610	585–606	22.9	Levels over top of levee.
Total		47.9	

The amount of expenditure chargeable to local surveys was $1,107.34.

The levels indicated that the grade line of the levee stood considerably lower in many places than when the previous levels were run. This condition is noted especially where fills of over 18 feet occur, and where old lake beds and sloughs are crossed by the levee line. These sinking levees should in the future be taken into account as a constant factor of levee depreciation, and due weight should be given this fact when the question of the relative economy of a revetment or a new levee location is being considered.

Conditions along reaches where active caving banks exist are as follows:

Lucca to Chicot (425–432 R.).—Continued caving is noted along the upper portion of this reach. Between September, 1908, and April, 1910, the distance from levee to river bank opposite station 483 was reduced from 590 feet to 450 feet. Future developments may indicate the necessity for a new levee covering this point the coming season. Caving continues very slowly along the upper portion of the reach. The new levee, stations 620 to 740, is now practically completed, and after the present high-water season the front line will be abandoned.

Gaines to Panther Forest (430–435 R.).—After the recession of the high water last spring the caving at the upper end of this reach commenced with renewed activity and the distance from center of levee to shore line at station 1530 was reduced from 500 feet to 130 feet in one month. Recommendation was at once made to the Tensas Basin levee board to construct a new levee, and they promptly provided for same, letting the contract July 21 and completing the new levee in ample time for the current high-water season. The old levee in front has been abandoned and cut near both junctions with the new levee. The controlling levee line at station 1740 is protected by the Panther Forest revetment.

Atherton, La. (558 R.).—Observations during the year developed that caving along the lower part of this reach was continuing with great rapidity. Opposite station 2220 the river bank caved about 800 feet from September, 1908, to March, 1910, leaving about 480 feet from center of levee to shore line. The average rate of caving since 1904 amounts to about 250 feet per annum. The construction of a new levee about 2 miles long, and estimated to cost about $60,000, is thought to be necessary during the coming season.

Mascot, La. (577 R.).—Caving has progressed steadily along this front, which if continued will necessitate a long line of levee within the next three years. The distance from center of levee to river bank is within 500 feet at several points between stations 3010 and 3050.

Omega to Millikens Bend, La. (578–582 R.).—The bank is caving slowly along this entire reach. The distance from center of levee to river bank at various points is as follows: Station 3190, 800 feet; 3274, 385 feet; 3290, 480 feet; and 3335, 1,000 feet. It is thought that possibly a new levee covering stations 3275 and 3290 will have to be built within the next two years. The entire reach of levee along this front is low, with the exception of the new Morancy loop, and it is considered unwise to undertake the improvement of the levee on account of the uncertainty of the existing location.

Cabin Teele, La. (583 R.).—Very active caving continued along this front. A new levee was constructed during the period, covering the threatened line of levee. The upper end of the new loop was built by the Government and the lower end by state authorities. The caving has extended to the center of the crown of the old levee since the new loop was completed.

Sparta to Duckport (588–590 R.).—The river bank is very close to the levee line along this front, but there has been practically no change since the last report. The caving has moved farther downstream. It is probable that a new levee will be needed near the lower portion of the reach in 1911 or 1912.

In the accompanying report on surveys will be found a discussion of caving banks along the following reaches not mentioned above: Matthews Bend (506–510 R.) and Reid-Bedford Bend (607 R.).

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CONDITION OF LEVEE LINE AND ESTIMATE FOR CONTINUED CONSTRUCTION.

Following is a statement relative to the general height of the levee line, assuming the completion of all levee work which has been provided for and which is now under contract; and correcting after taking into account the conditions as found by the most recent lines of levels over the top of the levee:

Above 1903 high water.	Arkansas River levees.		Mississippi River levees.				Totals.	
			In Arkansas.		In Louisiana.			
	Miles.	Per cent.	Miles.	Per cent.	Miles.	Per cent.	Miles.	Per cent.
1 to 2 feet	[a] 17.5	100.0	[b] 7.6	9.3	[b] 16.0	17.8	41.1	21.7
2 to 3 feet	.....	.....	28.2	34.4	11.7	13.0	39.9	21.0
3 to 4 feet	.....	.....	23.9	29.2	40.7	45.2	64.6	34.1
4 feet or more	.....	.....	22.2	27.1	21.6	24.0	43.8	23.2
Total	17.5	100.0	81.9	100.0	90.0	100.0	189.4	100.0
Levees with banquette	.....	.....	26.7	32.5	50.3	55.9	77.0	40.7

[a] Ten miles has section 6-foot crown, 3 to 1 back slope and 2.5 to 1 front slope; 2.6 miles has 6-foot crown, 3 to 1 back and 2 to 1 front slopes. Entire line grade 2 feet above 1903 high water.
[b] Several reaches stand to grade averaging just 2 feet above 1903 high water.

It will be noted that only about 41 per cent of the total mileage has a banquette section, and most of these reaches have banquettes considerably below the standard. It is observed during extreme high waters that numbers of reaches where the back slopes are deficient, and where the levee has been constructed of light material the land side section should be improved by adding banquettes or increasing the land side slope as soon as possible.

Since 1907 all enlargement work has been placed under the following project: To enlarge all reaches of the levee to a provisional grade of not over 4 feet above the 1903 high water, with standard section and to add a light topping 1.5 feet above gross grade, with 2-foot crown and 1 on 2 slopes. After deducting for all work completed and authorized under the above project, the following is an estimate for enlarging the balance of the line to the grade and section stated:

	Cubic yards.
Arkansas River levees	940,000
Levees in Arkansas	1,433,000
Levees in Louisiana	1,134,000
Light topping	172,000
Total	3,679,000

EXTENSION OF ARKANSAS RIVER LEVEE.

The end of the Arkansas River levee as contracted for will be in the lowest part of the swamp between the bank of the Arkansas River and the relatively high ground on Red Fork Bayou. A further extension of two miles would bring the levee well up on the higher ground, would gain about 5 feet in elevation at the base of the levee, and would lower the backwater approximately 0.8 of a foot for equal gauge heights. A gap of 1.5 miles would still remain between the Arkansas River and the Mississippi River levees, which would be ample to pass all the water coming out of Cypress Creek, even assuming crevasses and overflow conditions along the Arkansas River levees. The estimated cost of the two-mile extension would be as follows: 400,000 cubic yards, at 25 cents, amounting to $100,000.

CARE AND PRESERVATION OF LEVEES BY LOCAL AUTHORITIES.

All of the local authorities are now taking good care of their respective levee lines, except in the lower part of Desha County, Ark. Here hogs have been allowed to run at large, particularly above Arkansas City, and just below

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Arkansas City along the Fulton Lake levee great difficulty has been experienced in keeping travel off the top of the levee. The attention of the Desha levee board has been called to these abuses, and during the last two months some improvement has been noted.

PROGRESS OF DRAINAGE IN THE LEVEE DISTRICTS.

The Boggy Bayou drainage district in Desha County, Ark., completed their canal during the period, and the drainage is operating about as calculated. Much good has been accomplished which extends along the levee line, particularly back of the Fulton Lake levee. Plans are on foot to organize drainage districts along the fifth Louisiana levee district, extending also into Chicot County, Ark. Effective drainage will result in much good generally to the levee lines wherever put in operation.

SUMMARY OF EXPENDITURES.

The following is a summary of actual expenditures during the period:

	Amount.	Per cent.
Construction	$139,661.30	92.1
Repairs, etc	996.57	.7
Surveys, observations, etc	1,107.34	.8
Engineering [a]	9,752.42	6.4
Total field expenditures	151,537.63	100.0
Engineer office charges	2,886.31	.....
Total expenditures	154,423.94	.....

[a] Includes supervision of construction of levee work for the various levee boards, amounting to $75,089.73, which amount, if added to the above expenditures in the field, would make the cost of engineering 4.5 per cent.

HIGH WATER OF 1909.

Although the high water of 1909 was above flood stage (45 feet on the Vicksburg gauge) only twenty-five days, the work was stopped by it from March 1 to August 18, a period of one hundred and seventy days. On March 1 the river from Arkansas City to Vicksburg averaged 9.7 feet below the present nominal flood stage and remained higher than this for one hundred and fifty-six days, until August 4.

The high-water expenditures in 1909, incurred after the last annual report was submitted, amounted to $435.50, making a total of $1,955.26 expended on account of that high water.

HIGH WATER OF 1910.

At the date of this report there have been two minor freshets, both originating in the Ohio River and both of moderate heights. The second freshet, culminating at Cairo March 15, was the higher.

The following table shows the heights reached at the principal gauge stations, Cairo to Vicksburg, also a comparison with the highest stage of record at each point:

Station.	Miles below Cairo.	Flood stage.	Highest 1910.	Date.	Previous highest stage.		Above 1910.
					Year.	Feet.	
		Feet.	*Feet.*				*Feet.*
Cairo	.....	45	42.2	Mar. 15	1883	52.2	10.0
Helena	307	42	40.7	Mar. 21	1897	51.8	11.1
Mouth White River	393	42	44.5	Mar. 23	1903	53.7	9.2
Arkansas City	438	43	43.1	...do....	1903	52.9	9.8
Greenville	478	36	36.9	Mar. 24	1903	49.1	12.2
Lake Providence	542	36	36.9	Mar. 28	1903	46.5	9.6
Vicksburg	599	45	40.6	Mar. 26	1897	52.3	11.7

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FLOOD RECORDS FOR VICKSBURG.

The following is a statement of the maximum stages, and the duration of flood stage (45 feet) at Vicksburg, as far back as obtainable:

Year.	Maximum stage.	Date.	Duration above flood stage (45 feet).	
			Date.	Days.
	Feet.			
1828	46.38	No record	No record	
1844	46.18	June 28	do	
1849	46.38	Apr. 26	do	
1850	47.08	June 4	do	
1858	46.98	June 26	do	
1859	48.28	Apr. 21	do	
1862	51.10	Apr. 27	do	
1865	46.43	No record	do	
1867	49.02	do	do	
1872	39.50	May 2, 3	None	None.
1873	40.60	May 29, 30		None.
1874	45.70	May 2–5	Apr. 26–May 16	24
1875	43.00	Apr. 21		None.
1876	44.90	May 10		None.
1877	41.60	May 8–13		None.
1878	40.95	Mar. 24–27		None.
1879	39.45	Feb. 17		None.
1880	43.15	Apr. 8, 9		None.
1881	41.85	Mar. 10–12		None.
1882	48.75	Mar. 20, 21	Mar. 9–Apr. 6	38
1883	43.80	Apr. 7		None.
1884	49.00	Mar. 25	Mar. 1–May 18	78
1885	42.40	Feb. 8		None.
1886	44.15	May 7–9		None.
1887	44.70	Mar. 26–31		None.
1888	44.18	Apr. 26		None.
1889	34.46	July 3		None.
1890	49.05	Apr. 24, 25	Feb. 14–Mar. 30	95
1891	48.10	Apr. 2–4	Mar. 7–May 9	63
1892	48.45	June 2, 3	Apr. 23–July 5	73
1893	48.30	May 22, 23	May 8–June 21	44
1894	40.90	Apr. 2		None.
1895	31.70	Apr. 3, 4		None.
1896	39.00	Apr. 21		None.
1897	52.48	Apr. 16	Mar. 21–May 29	69
1898	49.40	Apr. 24, 25	Apr. 9–May 5	26
1899	47.30	Apr. 17–23	Apr. 1–May 2	31
1900	38.00	Mar. 27		None.
1901	41.50	May 16		None.
1902	41.22	Apr. 17		None.
1903	51.80	Mar. 28	Mar. 4–May 6	63
1904	46.85	Apr. 25	Apr. 16–May 2	16
1905	40.80	June 6		None.
1906	47.15	Apr. 26	Apr. 16–May 4	18
1907	49.70	Feb. 11	Jan. 23–Feb. 24	32
1908	47.90	Apr. 5–8	Mar. 12–July 3	113
1909	48.10	Apr. 2, 3	Mar. 16–Apr. 10	25
1910	40.60	Mar. 26		None.

The following statement shows the relation of the high-water stages, 1897 to 1910, inclusive, to the flood stages:

Year.	Cairo.	Memphis.	Helena.	Mouth White River.	Arkansas City.	Greenville.	Lake Providence.	Vicksburg.	Variation.	Average.
Flood stage	45.0	33.0	42.0	42.0	47.0	42.0	36.0	45 0	14.0	41.5
1897	6.6	4.8	9.8	10.4	4.9	4.8	8.4	7.4	5.6	7.1
1898	4.8	4.6	7.1	9.1	4.1	4.2	8.4	4.4	5.0	5.8
1899	1.2	2.2	4.8	6.5	1.6	1.0	5.7	2.3	5.5	3.2
1900	− 5.8	− 3.5	− 3.7	− 1.1	− 7.8	− 8.2	− 3.0	− 7.0	7.1	− 5.0
1901	− 1.8	− 0.9	− 0.5	2.7	− 3.7	− 4.6	0.5	− 0.5	7.3	− 1.1
1902	− 2.8	− 2.1	− 2.4	1.3	− 5.6	− 5.9	− 1.0	− 3.8	7.2	− 2.8
1903	5.6	7.1	9.0	11.7	5.9	7.1	10.5	6.8	6.1	8.0
1904	4.1	6.2	5.6	7.5	2.0	1.6	6.5	1.9	5.6	4.4
1905	− 6.6	− 4.0	− 5.0	− 0.8	− 7.2	− 8.1	− 2.5	− 7.3	7.3	− 5.2
1906	1.9	4.0	5.0	7.8	3.0	2.9	7.7	2.2	5.9	4.3
1907	5.3	7.2	8.4	9.9	5.1	5.3	10.3	4.7	5.6	7.0
1908	0.5	2.7	3.2	7.5	2.9	2.8	8.2	2.9	7.7	3.8
1909	2.3	5.6	5.7	7.9	3.1	2.8	8.4	3.1	6.1	4.9
1910	− 2.8	0.1	− 1.3	2.4	− 3.9	− 5.1	0.9	− 4.4	7.5	− 1.6
Average	.9	2.4	3.3	5.9	0.3	0.0	4.9	0.9	6.4	2.3

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The floods of 1909 and 1910 were the closest to the nominal flood stages. It will be seen that they were far from parallel, however, since they show a variation of 7.3 feet and 7.5 feet, respectively, in their relation to the flood stage at different stations.

The following is a record of the high-water stages since 1897, given for each station in the order of the heights of the floods:

Location.	Height.	Year.	Location.	Height.	Year.
Cairo	51.6	1897	Arkansas City	52.9	1908
	50.8	1903		52.1	1907
	50.3	1907		51.9	1897
	49.8	1898		51.1	1898
	49.1	1904		50.1	1909
	47.3	1909		50.0	1905
	46.9	1906		49.9	1903
	46.2	1899		49.0	1904
	45.5	1908		48.6	1899
	43.2	1901		43.3	1901
	42.2	1902		43.1	1910
	42.2	1910		41.4	1902
	39.2	1900		39.8	1905
	38.4	1905		39.2	1900
Memphis	40.2	1907	Greenville	49.1	1903
	40.1	1903		47.3	1907
	39.2	1904		46.8	1897
	38.6	1909		46.2	1898
	37.8	1897		44.9	1906
	37.6	1898		44.8	1909
	37.0	1906		44.8	1908
	35.7	1908		43.6	1904
	35.2	1899		43.0	1899
	33.1	1910		37.4	1901
	32.1	1901		36.9	1910
	30.9	1902		36.1	1902
	29.5	1900		33.9	1905
	29.0	1905		33.8	1900
Helena	51.8	1897	Lake Providence	46.5	1903
	51.0	1903		46.3	1907
	50.4	1907		44.4	1897
	49.1	1898		44.4	1898
	47.7	1909		44.4	1909
	47.6	1904		44.2	1906
	47.0	1906		43.7	1906
	46.8	1899		42.5	1904
	45.2	1908		41.7	1899
	41.5	1901		36.5	1901
	40.7	1910		36.9	1910
	39.6	1902		35.0	1902
	38.3	1900		33.5	1905
	37.0	1905		33.0	1900
Mouth White River	53.7	1903	Vicksburg	52.4	1897
	52.4	1897		51.8	1903
	51.9	1907		49.7	1907
	51.1	1898		49.4	1898
	49.9	1909		48.1	1909
	49.8	1906		47.9	1906
	49.5	1904		47.3	1899
	49.5	1908		47.2	1908
	48.5	1899		46.9	1904
	44.7	1901		44.5	1901
	44.4	1910		41.2	1902
	43.3	1902		40.6	1910
	41.2	1905		38.0	1900
	40.9	1900		37.7	1905

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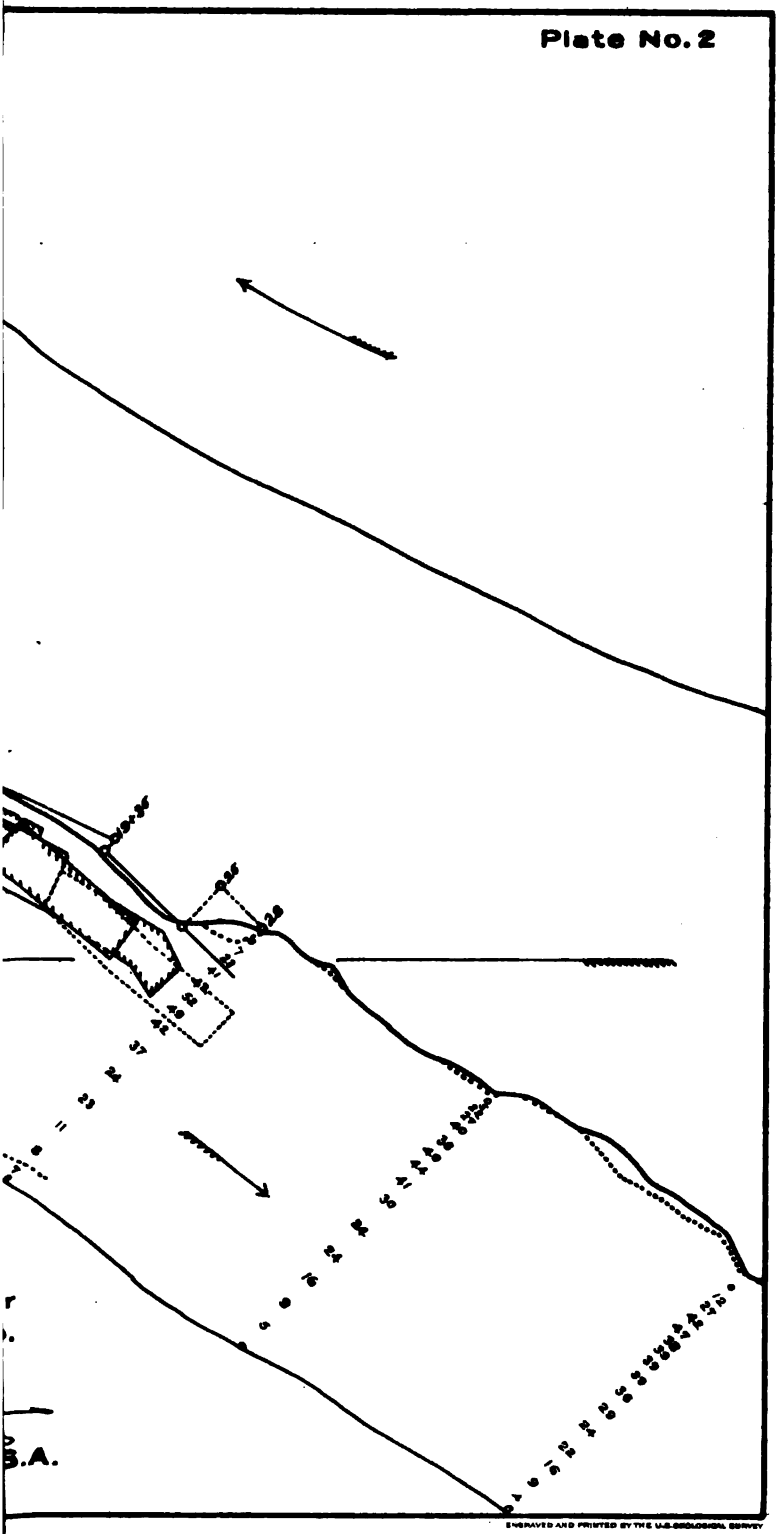
Plate No. 2



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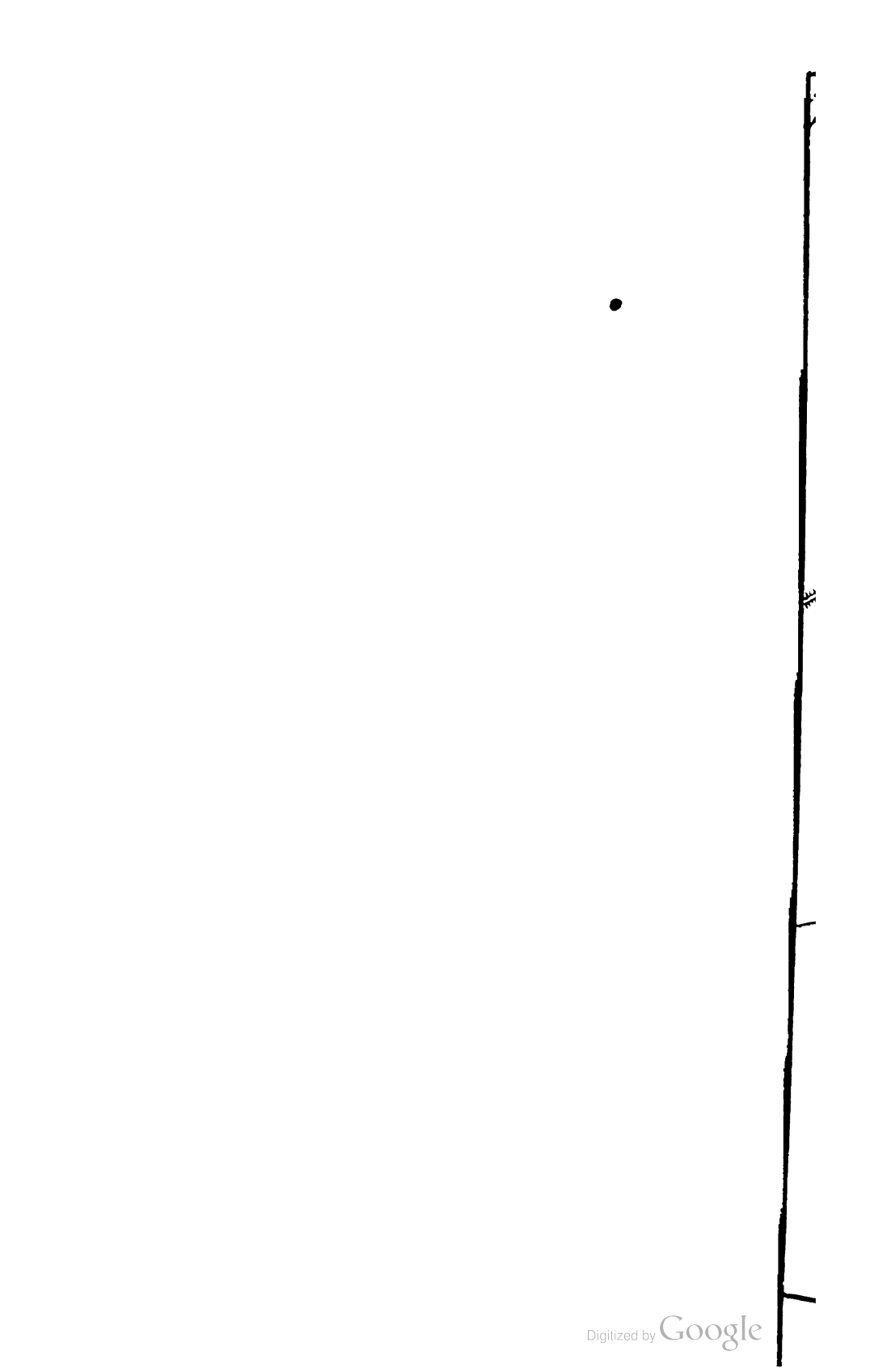

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Plate No.5

dings are reduced to Zero of the Greenville Gage.
ates work during fiscal year.
fascine mat intact.
woven " " .
" destroyed.
bar line and shore line of August 1908.
" " " " " " November 1908.

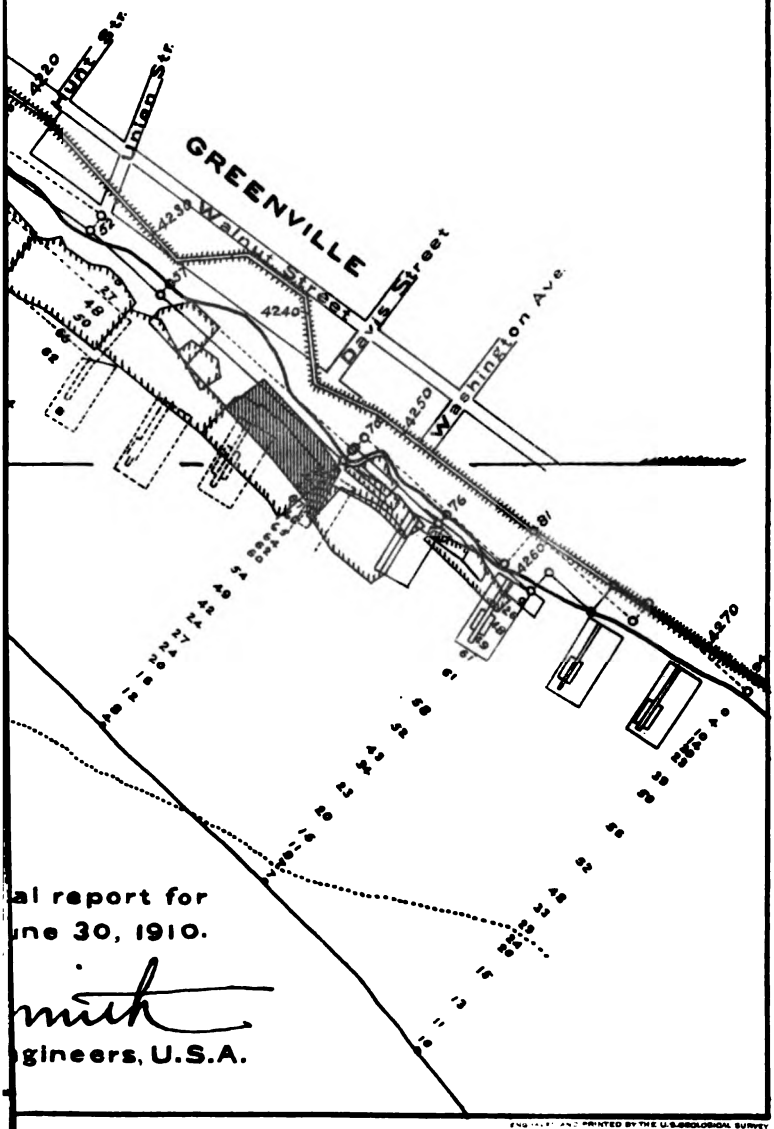

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Plate No. 6

pi River Commission
IRD DISTRICT

In Charge of
IITH, Corps of Engineers, U. S. A.

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SCALE OF FEET

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Corps of Engineers, U.S.A.

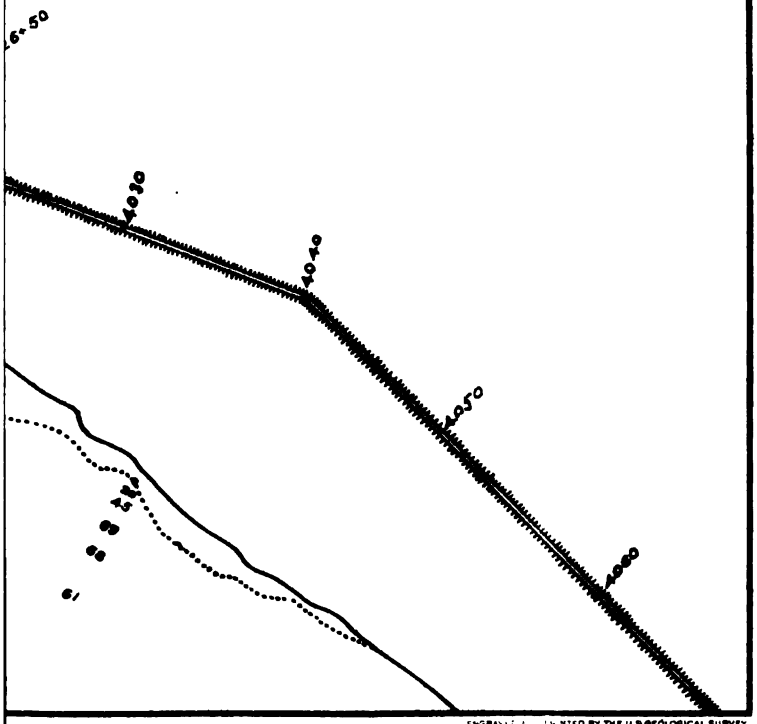

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Plate No. 9

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In Charge of
ITH, Corps of Engineers, U. S. A.

rofile of the
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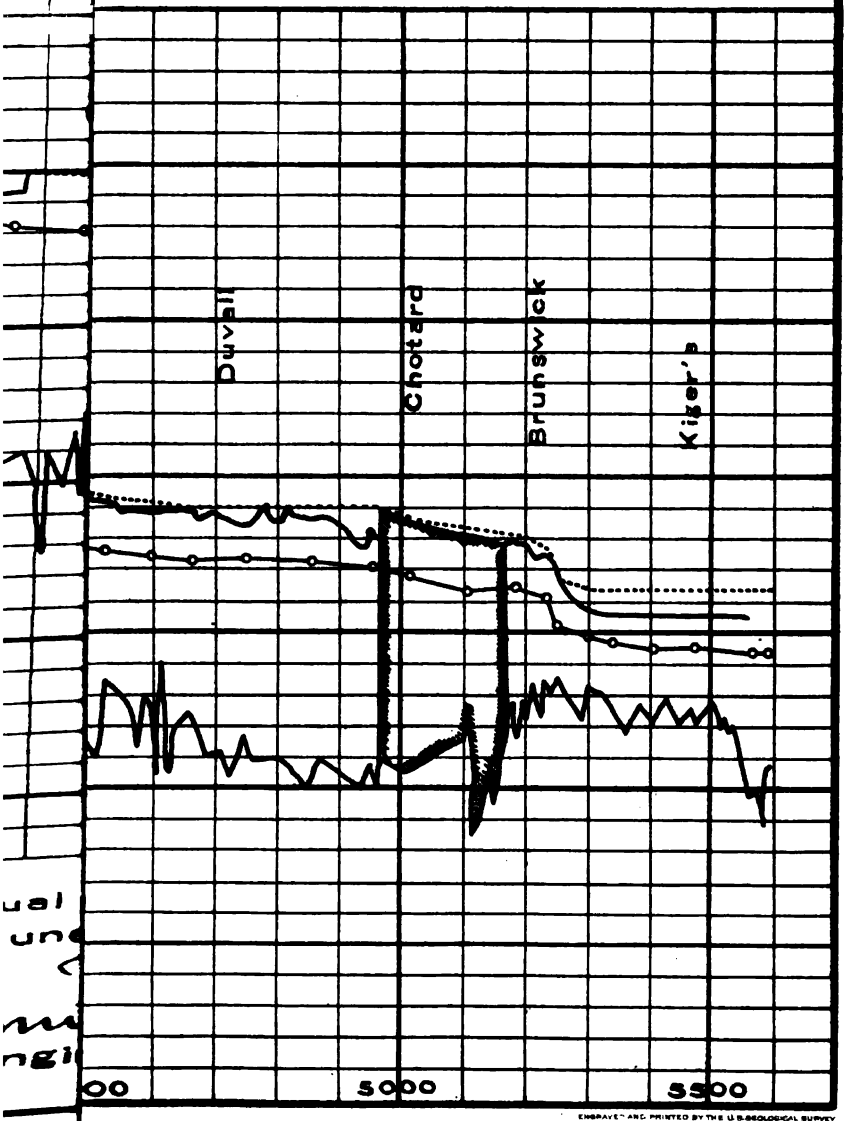

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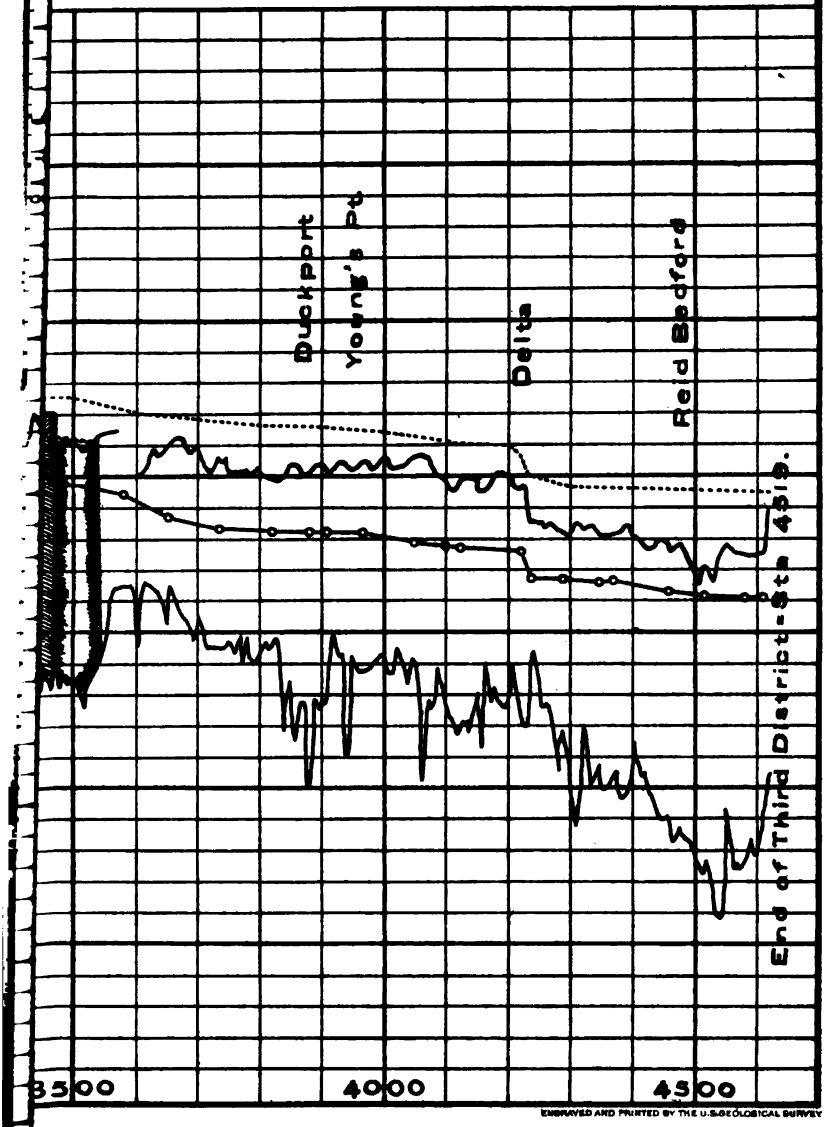
Plate No. 10

ppi River Commission
HIRD DISTRICT
In Charge of
MITH, Corps of Engineers, U. S. A.

Profile of the

NSAS LEVEE DISTRICT



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GAUGE RELATIONS.

The apparent relative increase in the maximum gauge relations at Lake Providence has suggested the following table in which the maximum readings for Arkansas City, Greenville, Lake Providence, and Vicksburg, and a differentiation of these readings are given.

Year.	Lake Providence reading.	Arkansas City.		Greenville.			Vicksburg.	
		Reading.	Above Lake Providence.	Reading.	Above Lake Providence.	Below Arkansas City.	Reading.	Above Lake Providence.
1897	44.4	51.9	7.5	46.8	2.4	5.1	52.4	8.0
1898	44.4	51.1	6.7	46.2	1.8	4.9	49.4	5.0
1899	41.7	48.6	6.9	43.0	1.3	5.6	47.3	5.6
1900	33.0	39.2	6.2	33.8	.8	5.4	37.7	4.7
1901	36.5	43.3	6.8	37.4	.9	5.9	44.5	8.0
1902	35.0	41.4	6.4	36.1	1.1	5.3	41.2	6.2
1903	46.5	52.9	6.4	49.1	2.6	3.8	51.8	5.3
1904	42.5	49.0	6.5	43.6	1.1	5.4	46.9	4.4
1905	33.5	39.8	6.3	33.9	.4	5.9	38.0	4.5
1906	43.7	50.0	6.3	44.9	1.2	5.1	47.2	3.5
1907	46.3	52.1	5.8	47.3	1.0	4.8	49.7	3.4
1908	44.2	49.9	5.7	44.8	.6	5.1	47.9	3.7
1909	44.4	50.1	5.7	44.8	.4	5.3	48.1	3.7
1910	36.9	43.1	6.2	36.9	.0	6.2	40.6	3.7

This table indicates a relatively higher level of the flood plane at Lake Providence in recent years.

Levee work in the Lower Yazoo levee district and in the Upper Tensas levee district was under the immediate supervision of Messrs. E. C. Tollinger and A. Miller Todd, assistant engineers. The essential features of their detailed reports, which have been filed at this office, are included in the foregoing report and the printed tables.

Appended to this report are 16 statements of details. Maps Nos. 1 to 10, inclusive, accompany.

Money statement, abstract of contracts in force, and apportionment of cost and deterioration of plant will be forwarded July 1, 1910.

Very respectfully, your obedient servant,

CLARKE S. SMITH,
Captain, Corps of Engineers.

Col. W. H. BIXBY,
Corps of Engineers, U. S. Army,
President Mississippi River Commission.

STATEMENT No. 1.—*Red Fork, Arkansas River.*

Statement of work done.	Cost.	Per cent.
20 squares bank paved, at $18.452	$369.04	39.18
4 days' towing (steamer Hider), at $76.335	305.34	32.41
Supervision	173.15	18.38
Property purchased	94.50	10.03
Total	942.03	100.00

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STATEMENT No. 2.—*Lake Bolivar front.*

Statement of work done.	Cost.	Per cent.
1,980 squares channel mattress, at $7.45—	$13,851.12	39.5
1,000 squares connecting mattress, at $9.04+	9,043.81	25.8
980 lin. ft. hydraulic grading, at $0.79—	756.80	2.1
980 lin. ft. grade dressed, at $0.18+	176.48	.5
434 squares bank paved, at $10.13+	4,398.20	12.5
100 lin. ft. hand grading, at $1.76+	176.48	.5
638.8 cu. yds. stone loaded, at $1.01—	644.11	1.84
3,263.8 cu. yds. stone loaded, at $0.36+	1,178.56	3.36
56 days' towing (steamer Hider), at $38.23	2,139.79	6.11
Supervision	839.30	2.39
Miscellaneous	1,239.12	3.54
Engineer office charges	603.17	1.72
Total	35,046.94	100.00

STATEMENT No. 3.—*Ashbrook Neck, Miss.*

Statement of work done.	Cost.	Per cent.
229 squares old paving repaired, at $7.46—	$1,707.89	57.43
138 squares pocket mattress, at $5.96—	822.09	27.63
9 days' towing (steamer Coppee), at $31.13+	280.20	9.42
Supervision	163.41	5.50
Total	2,973.59	100.00

STATEMENT No. 4.—*Panther Forest, Ark.*

Statement of work done.	Cost.	Per cent.
577 squares pocket mattress, at $8.25+	$4,761.29	54.20
2,000 linear feet bank cleared, at $0.19+	384.36	4.37
511.5 cubic yards stone unloaded, at $0.48+	248.57	2.83
10 squares paving repaired, at $21.39+	213.93	2.44
100 linear feet hand grading, at $2.12+	212.03	2.41
42 days towing (steamer Coppee), at $44.90+	1,886.10	21.47
Supervision	769.40	8.76
Laying up outfit	257.90	2.93
Miscellaneous	51.68	.59
Total	8,785.56	100.00

STATEMENT No. 5.—*Leland Neck, Ark.*

Statement of work done.	Cost.	Per cent.
8,340 squares channel mattress, at $5.95+	$49,688.65	44.30
1,480 squares connecting mattress, at $6.75+	9,998.00	8.92
150 squares bank revetment, at $7.63+	1,145.17	1.02
3,170 linear feet hydraulic grading, at $0.82+	2,600.00	2.32
3,170 linear feet slope dressed, at $0.51—	1,615.68	1.44
2,500 squares bank paved, at $7.55+	26,435.39	23.57
8 acres bank cleared, at $98.20+	785.62	.70
11,274 cubic yards stone loaded, at $0.36+	4,107.16	3.66
654 cubic yards stone unloaded, at $1.37+	897.85	.80
112 days towing (steamer Hider), at $49.81—	5,578.56	4.97
Supervision	1,186.54	1.06
Miscellaneous	5,070.97	4.52
Outfitting at Vicksburg	2,414.50	2.15
Engineer office charges	641.40	.57
Total	112,165.49	100.00

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Percentage of cost of the various expenditures.

Classification.	Amount.	Per cent.
Pay roll	$27,669.59	24.67
Subsistence	9,654.39	8.61
Material	66,714.64	59.48
Miscellaneous	8,126.87	7.24
Total	112,165.49	100.00

STATEMENT No. 6.—*Greenville Harbor.*

Statement of work done.	Cost.	Per cent.
1,875 squares channel mattress, at $6.453	$12,099.91	67.25
400 linear feet hydraulic grading, at $1.039	415.60	2.31
450 squares bank paved, at $5.53+	2,491.97	13.85
24 days towing (steamers Hider and Coppee), at $56.83	1,363.92	7.58
Minor repairs	550.47	3.06
Supervision	531.67	2.96
Miscellaneous	190.71	1.06
Engineer office charges	200.00	1.11
Total	17,992.21	100.00

STATEMENT No. 7.—*Lake Providence, La.*

70 squares of paving repaired, at $1.86+ $130.28

STATEMENT No. 8.—*Fitler's Bend, Miss.*

Statement of work done.	Cost.	Per cent.
2,583 squares channel mattress, at $6.36—	$16,419.58	47.63
961 squares pocket mattress, at $6.57+	6,313.92	18.31
735 squares bank paved, at $7.05+	5,181.84	15.03
37 squares paving repaired, at $2.35—	86.81	.25
1,080 linear feet hydraulic grading, at $0.92—	988.34	2.87
1,080 linear feet grade dressed, at $0.83+	901.29	2.61
137 squares revetment, at $3.69—	504.88	1.46
130 linear feet hand grading, at $3.52—	457.29	1.33
43 days towing (steamer Coppee), at $51.55—	2,216.59	6.43
Supervision	767.78	2.23
Property purchased	426.23	1.24
Miscellaneous	210.90	.61
Total	34,475.45	100.00

Percentage of cost of the various expenditures.

Classification.	Amount.	Per cent.
Pay roll	$9,447.69	27.40
Subsistence	3,188.78	9.25
Material	21,111.39	61.24
Miscellaneous	727.59	2.11
Total	34,475.45	100.00

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STATEMENT No. 9.—*Reid-Bedford Bend, La.*

Statement of work done.	Cost.	Per cent.
2,431 squares channel mattress, at $7.35	$17,860.46	35.42
1,093 squares bank paved, at $7.51+	8,212.15	16.29
925 squares pocket mattress, at $7.85—	7,260.56	14.40
1,050 linear feet hydraulic grading, at $1.46—	1,529.92	3.03
1,050 linear feet grade dressed, at $0.57+	600.39	1.19
694.5 cubic yards stone unloaded, at $0.69+	481.71	.96
694.5 cubic yards stone loaded, at $0.52—	357.80	.71
263 squares of revetment, at $4.13—	1,085.94	2.15
425 linear feet ditch dug, at $1.07+	455.54	.90
242 linear feet hand grading, at $1.83+	443.31	.88
13 acres bank cleared, at $18.12+	235.61	.47
183 squares paving repaired, at $1.07—	195.48	.39
52 days' towing (tug Parker), at $15.96—	829.78	1.64
63 days' towing (steamer Coppee), at $64.40+	4,057.39	8.05
Supervision	1,094.95	2.17
Inspection	139.57	.28
Property purchased	2,871.78	5.69
Miscellaneous	2,071.40	4.11
Engineer Office charges	642.75	1.27
Total	50,426.49	100.00

Percentage of cost of the various expenditures.

Classification.	Amount.	Per cent.
Pay roll	$13,753.88	27.27
Subsistence	3,919.44	7.77
Material	29,250.05	58.01
Miscellaneous	3,503.12	6.95
Total	50,426.49	100.00

STATEMENT No. 10.—*List of floating plant belonging to the third district.*

Name or number.	Number of pieces.	Name or number.	Number of pieces.
Steamer Arthur Hider	1	Line barges	2
Steamer H. St. L. Coppee	1	Graders Nos. 1 and 2	2
Steamer Control	1	Dry dock	1
Tug Parker	1	Skiffs	22
Gasoline yawl T. R	1	Boats, calking	5
Mattress boats	6	Carpenter shop and outfit	1
Headquarter boat No. 31	1	Machine shop and outfit	1
Quarterboats	10	Mooring barges	4
Square barges, first class	11	Loading barges	1
Square barges, second class	8		
Square barges, third class	9	Total	89

STATEMENT No. 11.—*Cost of repairs to plant, May 1, 1909, to April 30, 1910.*

Name or number.	Cost.	Work done.
Barge:		
No. 073	$5.38	Sides calked.
No. 074	16.68	Timberheads and hoods for hatches repaired.
No. 077	120.89	Sides and deck calked, hatches and hoods repaired, bolts tightened.
No. 078	14.34	Rakes calked.
No. 079	34.01	Gunwales repaired, rakes calked.
No. 081	30.30	Rakes and sides calked, hoods for hatches repaired, 2 kevels put on.
No. 082	128.14	Three pieces put in side, one in plankshear, rakes calked; drift, screw and timberhead bolts made; tie rods and corner plates repaired; hoods for hatches repaired.
No. 085	12.71	Sides calked.
No. 111	828.46	Docked. New bottom and rakes, one new timberhead, bottom strake of bulkhead renewed, braces in hold; calked, whitewashed, and painted.
No. 112	64.56	Deck and sides calked, deck pitched.
No. 564	53.67	Rakes and sides calked, chains and bolts tightened.

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STATEMENT No. 11.—*Cost of repairs to plant, etc.*—Continued.

Name or number.	Cost.	Work done.
Barge—Continued.		
No. 566	$1,222.00	Hoods for hatches repaired; docked; 5 strakes of gunwale on each side renewed; 16 rake pieces, 4 bottom planks, 4 timberheads, and 8 rake planks renewed; calked throughout except bottom and deck; painted and whitewashed.
No. 567	1,085.51	Docked. New sides put in with exception of top and bottom strakes; two streamers, 60 stanchions, 3 timberheads, and 2 iron kevels put in; rakes renewed; 4 hatch covers built; sides, rakes, bottom, and deck calked and later pitched; barge painted throughout.
No. 572	1,768.24	Docked. New sides, rakes, streamers, and stanchions; 7 rake pieces and 2 timberheads put in; calked throughout; deck pitched.
No. 574	169.63	Calked from light water up; 4 hatch hoods made, 14 rake planks put in.
No. 575	98.50	Repairing hoods for hatches.
No. 577	2,028.94	Docked. Sides, rakes, bottom, and deck calked; new sides and rakes put in; 7 timberheads, 14 rake pieces and 2 streamers; painted and whitewashed.
No. 580	1,662.75	Docked. Thirteen rake pieces, 2 raising pieces, 3 gunwales, and 8 rake planks renewed; sides and rakes calked; painted and whitewashed.
No. 581	1,122.69	Rakes and hoods repaired; 2 timberheads made; new deck; deck, rakes, and sides calked.
No. 582	771.52	Docked. Deck repaired and pitched; 4 stems put in; 3 gunwales renewed; new pieces put in deck and rakes; deck beams spliced; sides and rakes calked.
No. 583	1,811.45	Docked. One rake piece, 2 head blocks, 2 timber heads, 8 deck beams, 8 pieces in sides, 12 rake planks; deck patched; smokestacks and ventilators for cabin made; rakes and sides calked; hatches and hoods repaired.
No. 584	1,491.78	Docked. Six pieces in sides, new plank shear, 4 rake pieces, 3 timber heads; sides and rakes calked; deck patched; tool house built; cutting and straightening drift bolts and corner bands; hoods repaird.
No. 586	52.29	Repairing hoods, gunwales, timber heads, and deck.
No. 587	1,492.20	Docked. Four raising pieces, 6 gunwales, 1 head block, 8 timber heads, and 4 rake planks renewed; sides, bottom, and rakes calked; hoods repaired; painted and whitewashed.
No. 588	944.93	Docked. Sides, rakes, and bottom calked; new deck, gunwales sides, etc.
No. 589	161.27	Deck repaired and 2 timber heads put in; sides repaired; rakes and sides calked; pumps repaired.
Calking flats	138.41	One new one built; old ones repaired.
Construction	1,076.10	Cable clamps, wire twisters, hammer handles, wire cutters, boilers, coal boxes, capstan bars, pike poles, mat mauls, breast planks, etc. made and tools repaired.
Dry dock	714.99	Side sheathed; new stacks and breeching; pipe work renewed; pumps and machinery overhauled; sides and ends braced; calked from light water up; gate repaired and braced.
Dining boat:		
No. 88	446.07	Calked from light water up; ventilators, railing, stovepipes, and cooking ranges repaired; screened; new ranges built.
No. 156	305.70	Calked from light water up; roof, doors, and windows repaired; 2 timber heads made; cabin painted and screened; ranges repaired.
No. 158	259.60	Calked from light water up; deck and deck beams renewed; guards repaired; shelves put in; roof and cabin painted.
Grader:		
No. 1	682.21	Valves, pumps, boilers, commutator, dynamo, and siphons overhauled; roof, deck, and cabin repaired; calked from light water up; pipes renewed.
No. 2	966.79	Machinery overhauled; whitewashed and painted; engineer's room screened; doors and windows refitted.
General repairs	2,947.17	Fitting out boats for service; care of machinery; washing boilers; property repaired.
Loading barge No. 571	2,515.25	Docked. Streamers, rake pieces, lower strake of bulkhead, gunwales, head blocks, and braces in hold renewed; bottom calked; tool house built.
Machine boat No. 222	903.96	Deck and deck beams repaired; cabin and deck repaired and painted; deck and lower seams calked; capstan and pumps repaired.
Mat boat:		
No. 28	241.93	Calked from light water up; skids, brakes, and deck repaired; spool axles made.
No. 29	226.04	Same as mat boat No. 29.
No. 075	14,149.47	Skids made; calked from light water up; walkway built; painted.
No. 076	137.12	
No. 089	241.60	Reel axles and collars made; 8 outriggers; walkway built; calked from light water up.
No. 0810	203.83	
Office boat No. 568	850.03	Calked from light water up; roof repaired; docked; gunwales rebuilt; screened; 5 timber heads made.
Barge No. 573	79.27	Partitions and windows put in; roof repaired and painted; calked from light water up.
Property boat No. 204	14.03	Roof painted.
Pumps, barge	88.67	Patched, and new suckers put in.

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STATEMENT No. 11.—*Cost of repairs to plant, etc.*—Continued.

Name or number.	Cost.	Work done.
Quarter boat:		
No. 17	$48.00	Bunks put in; cabin repaired; calked from light water up.
No. 31	71.19	Screening doors and windows; guards and railing repaired.
No. 86	316.96	Partitions removed; bunks repaired; guards rebuilt; deck patched, painted.
No. 87	372.24	Deck, doors, and ventilators repaired; shed built on end; platform built; screened; pipes overhauled; calked from light water up.
No. 155	271.29	Two timber heads; ventilators repaired; painted; screened; railing repaired; calked from light water up.
No. 159	521.76	Two timber heads; guards repaired; 3 rooms ceiled; bunks made; painted; calked from light water up; roof repaired.
Steamer:		
Arthur Hider	3,292.81	Machinery overhauled; guards repaired; rudders, wheel, boiler deck, and cabin repaired; hull scraped and painted; breeching made; stacks renewed; new rudder stalls.
H. St. L. Coppee	3,535.17	Boilers scaled; new sheets in boilers; machinery and pipe work overhauled; wheel, railing, windows, roof, boiler deck, and main deck repaired; stacks lengthened; electric-light system repaired; fires put in auxiliary boilers; boiler covered and painted; bunkers lined; painted; pilot house braced.
Control	2,522.27	New roof; railing and cabin repaired; painted inside and out; heater coil repaired; calked from light water up; machinery overhauled; wheel and boilers repaired; old electric light plant removed and new one installed; hull reenforced.
Tug Parker	590.42	Ordinary repairs during the year.
Wages account	2,063.77	Supervision.
Gasoline yawl T. R	327.21	Yawl built and engine put in.
Carpenter boat No. 78	798.36	Engine, pumps, and piping overhauled; calked from light water up; deck on one end and head blocks renewed; new deck under boiler; cabin repaired.
Skiffs	68.86	New skiffs built; minor repairs made to old ones.
Surveys	35.45	Sawing stakes, making targets, etc.
Stone	35.51	Repairing carts.
Levees	76.32	High-water spikes.
Quarter boat No. 157	289.55	Two timber heads; guards, ventilators, and doors repaired; hull and cabin painted; calked from light water up; screened.
Total	45,618.22	

STATEMENT No. 12.—*Levee work in the Lower Yazoo levee district from May 1, 1909, to May 1, 1910.*

Station.	Miles below Cairo.	Contractor.	In contract.	Placed this year.	Total laborers.	Total teams.
			Cu. yds.	*Cu. yds.*		
900 to 950	380	Roach & Stansell	76,435	4,631	331	27
950 to 1000	381	Shields Bros. & Nystrom	78,000	11,305	899	57
1328 to 1500	397	do	206,000	158,689 a 668	8,571	6,36
2400 to 2550	416	do	183,000	87,265 a 3,625	4,320	3,03
1570 to 1645	502	W. T. Lowrance & Co	140,765	37,496 a 199	2,029	1,43
Total			684,200	303,878	16,150	11,68

Station.	Miles below Cairo.	Total scrapers.	Yards per team.	Yards per scraper.	Price per cubic yard. b	Average— Height.	Average— Haul.	Kind of work.
					Cents.	*Feet.*	*Feet.*	
900 to 950	380	186	17	25	23.70	22.1	300	Enlargement.
950 to 1000	381	381	30	30	25.25	22.3	200	Do.
1328 to 1500	397	4,188	26	38	21.85	18.6	247	Do.
2400 to 2550	416	1,978	46	46	22.69	21.8	200	Do.
1570 to 1645	502	915	41	41	27.90	20.4	200	Do.
Total		7,648	26	40	a 22.93	20.1	226	

a Drain ditch.
b Price per cubic yard for drain ditch, 18 cents.
a Average price, exclusive of drain ditches, 23.01 cents per cubic yard.

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STATEMENT No. 13.—*Rainfall at Greenville, Miss., May 1, 1909, to May 1, 1910.*

Month and year.	Rainfall.	Mean for twenty-four years.
1909.	*Inches.*	*Inches.*
May	8.81	3.86
June	3.89	3.80
July	2.53	4.20
August	0.83	3.48
September	4.56	3.06
October	1.67	2.05
November	1.91	3.92
December	6.57	4.31
1910.		
January	6.91	4.78
February	4.34	4.41
March	0.16	5.72
April	2.99	4.02
Total	45.17	47.63

STATEMENT No. 14—*Levee construction by the Mississippi levee board from May 1, 1909, to May 1, 1910.*

Station.	Miles below Cairo.	Cubic yards placed.	Price per cubic yard.	Total expended.	Kind of work.
Above Greenville:			*Cents.*		
500 to 600	374	76,520	28	[a] $22,227.30	Enlargement.
600 to 715	376	44,438	16.9	[b] 6,383.52	Do.
715 to 862	378	24,056	25	[b] 5,111.90	Do.
862 to 900	379	29,995	22.9	[a] 7,619.12	Do.
1000 to 1038	380	33,345	28	[a] 10,348.88	Do.
1016 to 1038	380	5,974	16.7	997.66	Banquette.
1208 to 1226	395	13,129	18 / 24.95	3,090.19	Enlargement and landside berm.
1490 to 1500	398	6,200	23	1,426.00	Road crossings.
2499 to 2503	416	4,239	30	1,271.70	Subbanquette.
2070 to 2785	418	45,353	24	[b] 9,252.01	Enlargement.
3100 to 3224	434	109,840	29.9	32,842.16	Do.
3234 to 3330	435	86,015	22.9	19,697.44	Do.
3547 to 3601	445	32,502	28	[b] 7,735.47	Do.
3601 to 3680	456	112,566	27.5 / 29.9	[a] 33,408.31	Do.
Below Greenville:					
32 to 210	480	156,313	15.4 / 16.87	24,950.74	Do.
300 to 520	488	235,678	18.87	44,472.44	Do.
623 to 625	492	4,050	(c)	604.50	Cutting out holes in levee.
939 to 1154	493	9,249	(c)	3,150.45	Repairing wave wash.
1486 to 1567	502	11,785	(c)	3,123.95	Do.
1570 to 1650	503	40,913	19.98 / 17.98	[b] 6,828.12	Enlargement and banquette.
2901 to 3256	535	11,253	(c)	2,805.54	Repairing road crossing and wave wash.
3250 to 3311	540	1,865	14.9	[a] 1,205.56	Banquette.
3385 to 3603	544	13,866	(c)	3,438.54	Repairing wave wash.
3908 to 3978	552	1,110	(c)	240.00	Do.
4022 to 4108	553	86,032	19.44	16,724.62	Enlargement.
4108 to 4198	554	54,672	26.95	[b] 12,523.98	Do.
4894 to 5018	569	90,729	29	[a] 26,850.77	Do.
4962 to 5000	570	29,853	22.4	[a] 7,724.75	Do.
5000 to 5160	572	129,168	22	[b] 24,153.48	Do.
Total		1,501,303		[d] 340,204.10	

[a] Retained 15 per cent on work of previous years included.
[b] Retained 15 per cent not included.
[c] Day force.
[d] Does not include $13,977.96 for high-water protection; $1,371.28 for haul-over on Waxhaw levee, and $2,540.13 for weed cutting, sodding, and repairing road crossings.

Engineering and inspection not included in above.
No charge for cost of general administration included in above.

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STATEMENT No. 15.—*Levee work in the Upper Tensas levee district, May 1, 1909, to May 1, 1910.*

Station.	Miles below Cairo.	Contractor.	In contract.	Placed during year.	Total laborers.	Total teams.
			Cu. yds.	*Cu. yds.*		
778 to 871	Ark. R.	Leonard & Rogers	70,571	[a] 806	4,748	3,526
871 to 916	Ark. R.	W. T. & E. M. Lowrance	[b] 90,000			
360 to 390	427	Roach & Stansell	46,000	9,309	1,970	1,549
560 to 620	429	....do	67,736	[a] 12,030	3,783	3,636
1240 to 1360	442	Shields Bros. & Nystrom	78,000	64,671	3,347	2,296
1360 to 1490	446	....do	83,155	[a] 83,155	3,975	2,783
1941 to 2050	467	Clark & Parker	102,000	19,909	1,016	801
2050 to 2155	468	Donovan & Daley	117,310	[a] 57,408	7,302	5,402
3460 to 3530	506	O. A. Gibson	104,801	[a] 46,251	7,410	5,671
3407 to 3428	583	Roach & Stansell	88,263	[a] 88,263	4,872	3,754
3428 to 3448	583	....do	105,338	[a] 105,338	6,028	4,149
3448 to 3473	583	....do	118,434	[a] 118,434	6,939	4,884
Total			1,071,608	605,574		

Station.	Miles below Cairo.	Total scrapers.	Yards per scraper.	Yards per team.	Price per cubic yard.	Average— Height.	Average— Haul.	Kind of work.
					Cents.	*Feet.*	*Feet.*	
778 to 871	Ark. R.	2,288	20	31	29.5	17.5	375	New levee.
871 to 916	Ark. R.				32.7	18.5		Do.
360 to 390	427	[c] 1,058	6	9	33.0	22.0	600	Enlargement.
560 to 620	429	[d] 3,268	19	21	33.0	17.0	1,100	Do.
1240 to 1360	442	1,416	28	45	18.49	14.4	325	Do.
1360 to 1490	446	1,716	30	48	16.35	14.6	225	Do.
1941 to 2050	467	524	25	38	19.9	16.0	250	Do.
2050 to 2155	468	[e] 3,599	22	30	27.7	18.6	350	Do.
3460 to 3530	506	[f] 3,843	19	28	28.5	18.0	400	Do.
3407 to 3428	583	2,492	23	35	21.0	18.1	250	New levee.
3428 to 3448	583	2,700	25	39	21.0	18.9	275	Do.
3448 to 3473	583	3,090	24	38	21.0	18.8	250	Do.

[a] Contracts completed during period.
[b] Contract with W. M. Bates annulled, and work relet as above.
[c] Used 60 dump wagons, estimated equal to 2 scrapers each.
[d] Used 1,410 dump wagons, estimated equal to 2 scrapers each.
[e] Used 59 dump wagons, estimated equal to 2 scrapers each.
[f] Used 120 drag scrapers, estimated equal to ½ scraper each.

STATEMENT No. 16.—*Levee construction by the levee boards in Arkansas and Louisiana from May 1, 1909, to May 1, 1910.*

Levee board.	Station.	Miles below Cairo.	In contract.	Placed during year.	Price per cubic yard.	Amount expended.	Kind of work.
			Cu. yds.	*Cu. yds.*	*Cents.*		
In Arkansas:							
Chicot	2155 to 2390	484	[a] 113,675	4,224	23.0	$1,148.55	Enlargement.
	3950 to 4050	512	102,000	50,619	21.0	8,763.25	Do.
Tensas Basin	650 to 699	431	311,063	101,800	24.0	24,432.00	New.
	650 to 699	431	31,412	5,500	18.0	990.00	Ditch.
	791 to 904	435	[a] 127,904	26,104	27.5	7,178.60	Enlargement.
	1020 to 1240	437	250,000		26.9		Do.
	1020 to 1240	437	2,900	2,700	18.0	486.00	Ditch.
	1191 to 1540	450	[a] 195,140	195,140	16.45	32,100.53	New.
In Louisiana:							
Fifth Louisiana	0 to 256	522	[a] 68,442	587	[b] 26.4	154.97	Enlargement.
	1985 to 2110	555	[a] 152,086	17,186	18.5	3,179.41	Do.
	1985 to 2110	555	[a] 55,502	3,102	18.5	573.87	Spur.
	1985 to 2110	555	[a] 14,134	14,134	23.75	3,352.82	Do.
	3458 to 3495	584	[a] 313,335	300,535	25.0	75,133.75	New.
	1060 to 1086	535	28,439	24,000	23.9	5,736.00	Enlargement.
	4428 to 4633	605	66,000	41,300	23.9	9,870.70	Banquettes.
State of Louisiana	0 to 256	522	[a] 251,901	27,468	26.4	7,251.55	Enlargement.
Summary:							
In Arkansas			1,134,094	386,087		75,098.93	
In Louisiana			949,839	428,312		105,253.07	
Grand total			2,083,933	814,399		180,352.00	

[a] Contract completed during the period. [b] Paid for by district under state contract.

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MISSISSIPPI RIVER COMMISSION, THIRD DISTRICT.

FINANCIAL STATEMENT.

Appropriation for improving Mississippi River, third district.

LAKE BOLIVAR FRONT.

July 1, 1909, balance unexpended	$28,850.25
June 30, 1910, amount expended during fiscal year	25,850.25
Amount that can be profitably expended during fiscal year ending June 30, 1912	40,000.00

PANTHER FOREST, ARK.

July 1, 1909, balance unexpended	$11,688.58
June 30, 1910, amount expended during fiscal year	11,688.58
Amount that can be profitably expended in fiscal year ending June 30, 1912	40,000.00

LELAND NECK, ARK.

Amount allotted from sundry civil act approved March 4, 1909	$105,000.00
June 30, 1910, amount expended during fiscal year	105,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1912	80,000.00

GREENVILLE, MISS.

July 1, 1909, balance unexpended	$16,168.71
June 30, 1910, amount expended during fiscal year	16,168.71
Amount that can be profitably expended in fiscal year ending June 30, 1912	40,000.00

VAUCLUSE, ARK.

July 1, 1909, balance unexpended	$8,798.39
June 30, 1910, amount expended during fiscal year	7,717.21
July 1, 1910, balance unexpended	1,081.18
July 1, 1910, outstanding liabilities	1,081.18
Amount that can be profitably expended in fiscal year ending June 30, 1912	80,000.00

FITLERS BEND.

July 1, 1909, balance unexpended	$34,649.54
June 30, 1910, amount expended during fiscal year	34,649.54
Amount that can be profitably expended in fiscal year ending June 30, 1912	80,000.00

ALBEMARLE BEND.

No allotment or expenditure during fiscal year 1910.	
Amount that can be profitably expended in fiscal year ending June 30, 1912	$80,000.00

REID-BEDFORD BEND.

July 1, 1909, balance unexpended	$15,468.54
June 30, 1910, amount expended during fiscal year	15,468.54
Amount that can be profitably expended in fiscal year ending June 30, 1912	80,000.00

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GENERAL REPAIRS TO EXISTING WORKS.

July 1, 1909, balance unexpended		$30,099.29
Amount allotted from sundry civil act approved March 4, 1909		70,000.00
		100,099.29
June 3, 1910, amount expended during fiscal year, account different works, as follows:		
Upper Tensas levee district (Red Fork revetment)	$1,093.03	
Lake Bolivar front	3,354.82	
Ashbrook Neck	1,580.19	
Panther Forest, Ark	1,307.26	
Leland Neck, Ark	4.88	
Lake Providence reach	129.78	
Fitlers Bend	8.00	
Reid-Bedford Bend	19,404.44	
Plant, third district	12,237.63	
		39,120.03
July 1, 1910, balance unexpended		60,979.26
July 1, 1910, outstanding liabilities		12,400.00
July 1, 1910, balance available		48,579.26
July 1, 1910, amount covered by uncompleted contracts		48,579.26
Amount that can be profitably expended in fiscal year ending June 30, 1912		120,000.00

STONE, THIRD DISTRICT.

July 1, 1909, balance unexpended	$4,440.16
June 30, 1910, amount expended during fiscal year	4,440.16
Amount that can be profitably expended in fiscal year ending June 30, 1912	40,000.00

PLANT, THIRD DISTRICT.

July 1, 1909, balance unexpended	$34,998.96
Amount allotted from sundry civil act approved March 4, 1909	130,000.00
Amount received from sale of public property, reallotted	468.75
Amount received through damage suit, reallotted	346.46
	165,814.07
June 30, 1910, amount expended during fiscal year	67,033.91
July 1, 1910, balance unexpended	98,780.16
July 1, 1910, outstanding liabilities	19,725.00
July 1, 1910, balance available	79,055.16
July 1, 1910, amount covered by uncompleted contracts	76,600.00
Amount that can be profitably expended in fiscal year ending June 30, 1912	90,000.00

SURVEYS, THIRD DISTRICT.

Amount allotted from sundry civil act approved March 4, 1909	$5,000.00
June 30, 1910, amount expended during fiscal year	4,858.54
July 1, 1910, balance unexpended	141.46
July 1, 1910, outstanding liabilities	141.46
Amount that can be profitably expended in fiscal year ending June 30, 1912	5,000.00

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LOWER YAZOO LEVEE DISTRICT.

July 1, 1909, balance unexpended	$61,374.50
Amount allotted from sundry civil act approved March 4, 1909	110,000.00
	171,374.50
June 30, 1910, amount expended during fiscal year	86,266.07
July 1, 1910, balance unexpended	85,108.43
July 1, 1910, outstanding liabilities	200.00
July 1, 1910, balance available	84,908.43
July 1, 1910, amount covered by uncompleted contracts	49,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1912	125,000.00

UPPER TENSAS LEVEE DISTRICT.

July 1, 1909, balance unexpended	$90,677.82
Amount allotted from sundry civil act approved March 4, 1909	130,000.00
	220,677.82
June 30, 1910, amount expended during fiscal year	157,088.63
July 1, 1910, balance unexpended	63,589.19
July 1, 1910, outstanding liabilities	400.00
July 1, 1910, balance available	63,189.19
July 1, 1910, amount covered by uncompleted contracts	56,200.00
Amount that can be profitably expended in fiscal year ending June 30, 1912	125,000.00

Abstract of contracts in force June 30, 1910.

Name of contractor.	Character and amount of material or articles contracted for.	Unit price.	Date of—		
			Approval.	Beginning.	Expiration.
Shields Bros. & Nystrom	80,000 cubic yards levee work.	$0.2525	Dec. 17, 1908	Sept. 6, 1909	Jan. 1, 1910[a]
Do	206,000 cubic yards levee work.	.2185	July 31, 1909	Aug. 23, 1909	Mar. 1, 1910[a]
Do	183,000 cubic yards levee work.	.2269	....do....	Aug. 18, 1909	Do.[a]
Roach & Stansell	40,000 cubic yards levee work.	.33	June 6, 1907	Dec. 11, 1908	Jan. 1, 1909[a]
Shields Bros. & Nystrom	80,000 cubic yards levee work.	.1849	July 31, 1909	Nov. 17, 1909	Mar. 1, 1910[a]
Clark & Parker	90,000 cubic yards levee work.	.1990	Aug. 9, 1909	Nov. 29, 1909	Do.[a]
W. T. & E. M. Lowrance	90,000 cubic yards levee work. 5,000 cubic yards levee work.	.327 .347	Nov. 1, 1909	Not begun	Jan. 1, 1911
American Bridge Co	4 steel barges	9,400.00	Dec. 9, 1909	Dec. 17, 1909	Aug. 13, 1910
Do	1 steel floating dry dock.	30,000.00	Mar. 5, 1910	Apr. 1, 1910	Nov. 9, 1910
Grafton Quarry Co	3,000 cubic yards of stone and quarry spalls.	.75	(b)	June 20, 1910	June 23, 1910[c]
Foster-Creighton-Gould Co	20,000 cubic yards of stone.	1.99	(b)	Not begun	Dec. 31, 1910
C. W. Hunter	36,000 cords of brush and poles.	1.65	(b)	....do....	Indeterminate.

[a] Time limit waived. [b] Emergency contract. [c] Completed, but not paid for.

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Data of cost of revetment, May 1, 1909, to May 1, 1910.

[Submitted in compliance with resolution of Mississippi River Commission.]

	Expended as per financial statement.	Debits: To material transferred from reserve, etc.	Credits: By material transferred to reserve, etc.	Construction.	Repairs.	Surveys.	Care, repairs, and deterioration of plant.	Total.
Upper Tensas levee district, at Red Fork, Ark.	a$1,043.03	$294.34	$446.48	.....	$890.89	$67.96	$710.18	$1,669.03
Lake Bolivar front	25,944.10 a3,354.82	13,070.67	7,341.51	$20,600.00	14,428.08	212.96	3,984.15	39,225.19
Ashbrook Neck	a1,580.19	1,731.84	299.65	.....	3,012.38	581.96	5,829.06	9,423.39
Panther Forest, Ark.	12,158.45 a260.01	3,825.36	2,596.45	.....	13,647.37	113.27	1,847.27	15,607.91
Leland Neck, Ark.	104,525.38	35,500.85	27,723.54	112,302.69	.....	178.41	7,864.18	120,345.28
Greenville, Miss.	16,163.24	7,717.57	5,742.97	.....	18,137.84	707.96	7,881.04	26,726.84
Vaucluse, Ark.	7,478.89	.....	6,506.91	.....	971.98	113.27	1,155.64	2,240.89
Longwood, Miss.	.....	.....	.....	.....	.....	237.88	2,315.50	2,553.38
Louisiana Bend	.....	.....	.....	.....	.....	639.99	6,229.79	6,869.78
Lake Providence Reach.	a129.78	.....	87.50	.....	42.28	713.63	6,948.80	7,704.71
Fitlers Bend	31,653.00	10,470.05	7,149.51	34,973.54	.....	169.91	3,562.17	38,705.62
Delta Point	.....	.....	.....	.....	.....	334.16	3,252.72	3,586.88
Reid-Bedford Bend	15,021.61 a18,460.49	20,043.52	1,096.08	48,815.68	4,213.86	198.23	4,822.93	58,050.70
Total	238,372.99	92,654.20	58,990.60	216,691.91	55,344.68	4,269.58	56,403.43	332,709.00

a Amount expended account this work from allotment for "General repairs to existing works."

Crossings in the third district, improving Mississippi River, where depths of 1¼ feet or less were found during the low-water season September, 1909, to January, 1910, inclusive.

[To accompany annual report of Capt. Clarke S. Smith, Corps of Engineers, U. S. Army, for the year ending May 31, 1910.]

Localities, and nearest gauge.	Miles below Cairo.	Day of month.	Nearest gauge reading.	Depth on crossing.
September, 1909.			*Feet.*	*Feet.*
Greenville gauge	478	.....	.....	.....
Salona Crossing	473	27	8.0 F.	13.5
Sterling Crossing	515	30	7.8 F.	13.5
Vicksburg gauge	599	.....	.....	.....
Salem Crossing	565	28	9.5 F.	12.0
Henderson Crossing	573	28	9.5 F.	12.0
Race Track Crossing	602	10	10.5 F.	13.5
October, 1909.				
Arkansas City gauge	438	.....	.....	.....
Island 82 Crossing	455	20	0.0 F.	12.0
Greenville gauge	478	.....	.....	.....
Salona Crossing	473	18	4.0 F.	*8.5
Do	.....	25	4.0 R.	*8.5
Lake Providence gauge	542	.....	.....	.....
Sterling Chute	515	13	4.8 F.	12.0
Ashton Crossing	520	13	4.8 F.	12.0
Do	.....	15	4.2 F.	10.5
Do	.....	22	3.0 F.	9.0
Do	.....	31	5.0 S.	10.5
Wilsons Point	531	11	5.0 F.	12.0
Do	.....	15	4.2 F.	10.5
Do	.....	21	3.0 F.	10.5
Lake Providence	541	11	5.0 F.	9.0
Do	.....	15	4.2 F.	9.0
Do	.....	21	3.0 F.	10.5
Do	.....	30	5.0 S.	10.5
Vicksburg gauge	599	.....	.....	.....
Salem Crossing	565	1	8.7 F.	10.5
Do	.....	20	4.5 F.	9.0
Do	.....	23	4.2 F.	9.0
Do	.....	27	4.8 R.	9.0

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Crossings in the third district, improving Mississippi River, etc.—Continued.

Localities, and nearest gauge.	Miles below Cairo.	Day of month.	Nearest gauge reading.	Depth on crossing.
October, 1909—Continued.				
Vicksburg gauge—Continued.			*Feet.*	*Feet.*
Henderson Crossing	573	11	6.7 F.	9.0
Do		20	4.5 F.	9.0
Do		27	4.8 R.	10.5
Do		29	5.6 R.	10.5
Youngs Point Crossing	590	16	5.2 F.	10.5
Do		20	4.5 F.	12.0
Do		24	4.2 R.	13.5
Do		26	4.4 R.	9.0
Race Track Crossing	602	16	5.2 F.	10.5
November, 1908.				
Greenville gauge	478			
Island 82 Crossing	455	8	4.5 F.	12.0
Salona Crossing	473	11	4.6 R.	*8.5
Do		15	5.2 R.	9.0
Do		18	6.5 R.	10.5
Do		22	9.5 R.	12.0
Lake Providence gauge	542			
Ashton Crossing	520	1	4.8 F.	12.0
November, 1909.				
Lake Providence gauge	542			
Ashton Crossing	520	7	3.7 F.	13.5
Do		16	4.4 R.	13.5
Wilsons Point Crossing	531	4	4.0 S.	10.5
Do		7	3.7 F.	13.5
Do		12	3.9 R.	12.0
Do		18	5.2 R.	13.5
Lake Providence Crossing	541	2	4.6 F.	12.0
Do		7	3.7 F	12.0
Salem Crossing	565	2	4.6 F.	12.0
Do		4	4.0 S.	10.5
Vicksburg gauge	599			
Henderson Crossing	573	2	5.7 F.	9.0
Do		3	5.5 F.	10.5
Youngs Point Crossing	590	2	5.7 F.	9.0
December, 1909.				
Greenville gauge	478			
Salona Crossing	473	31	10.5 F.	13.5
January, 1910.				
Greenville gauge:				
Salona Crossing	473	1	10.5 F.	13.5
Do		3	8.0 F.	10.5
Island 82 Crossing	455	3	8.0 F.	13.5
Do		11	7.5 R.	12.0
Salona Crossing	473	11	7.5 R.	10.5

In the foregoing table the soundings marked with an (*) were made by towboats en route with tows. It is not certain that the boat was in the deepest channel at the time the soundings were made, and it was not convenient to stop for investigation as to whether or not a deeper channel was available.

In all other cases a least depth of 9 feet was found, and no further investigation was made for greater depths.

APPENDIX 4.

REPORT OF MAJ. HARRY BURGESS, CORPS OF ENGINEERS, ON OPERATIONS IN THE FOURTH DISTRICT.

MISSISSIPPI RIVER COMMISSION, FOURTH DISTRICT,
New Orleans, La., May 31, 1910.

COLONEL: I have the honor to submit the following report upon the work of the fourth district, Mississippi River improvement for the year ending May 31, 1910.

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The fourth district extends from Warrenton, Miss., 7½ miles below Vicksburg, Miss., to the Head of the Passes, about 13 miles from the Gulf of Mexico, a distance of 452.8 miles by river.

The works include bank protection in Bondurant Chute; bank protection in Kempe Bend; the improvement of the harbors at Natchez, Miss., and Vidalia, La.; improvement at the junction of the Mississippi, Red, and Atchafalaya rivers; improvement of the harbor at New Orleans, La.; and the construction, repair, and maintenance of the levee system of the district.

1. BONDURANT CHUTE REVETMENT.

For history of this work, project, and details of its execution, see current annual report of the Mississippi River Commission, and annual reports of the Mississippi River Commission since 1901.

At the date of the last report the length of the revetment measured parallel to the general shore line was 3,440 feet.

At the beginning of the present season the work contemplated in Bondurant Chute was to make such repairs to the existing revetment as might be found necessary, to extend the lower end of the revetment, and to grade and pave with rock the bank between ordinary and extreme low water, where mattresses had more or less rotted away.

The chute not being accessible to boats at low water, when the work required the past season had to be done, 1,053 tons of rock were unloaded on the bank in March, 1909, for the work in 1909–10. Soundings were taken in the pool along the revetment in November, 1909, and the bank line located for about 1,800 feet below where caving is still active. Filling has occurred in the pool along the upper half of the revetment since the survey made in 1906, but practically no change has taken place along the lower part.

Work was commenced in pursuance of the project August 25, and completed September 15. There were constructed and sunk in the pocket at the lower end 10,395 square feet of mattress, extending the work 110 feet; 38,350 square feet of bank was paved with rock covering 951 linear feet, and 8,977 square feet of old pavement repaired.

Constructing and sinking mats.—The mats required were constructed on the bank of the low-water pool in the chute and towed by hand and sunk in the pocket. The total cost of constructing and sinking the 10,395 square feet of mattress amounted to $722.59, divided as follows:

Lumber, wire, nails, etc	$55.56
70 tons of rock, at $2.75	192.50
Teams	20.00
Provisions	91.63
Pay rolls	362.90
Total	722.59

Grading bank.—The old mattresses had to be removed in places and the bank graded; also the bank in the pocket had to be graded by hand to a proper slope. The grading of 16,732 square feet cost $392.88.

Paving bank.—The bank was paved with the rock stored on the bank. A total of 38,350 square feet was paved, at a cost of $3,270.25, divided as follows:

566 tons of rock, at $2.75	$1,556.50
353 tons of rock, at $2.25	794.25
Teams	44.00
Provisions	273.00
Pay rolls	602.50
Total	3,270.25

Repairing pavement.—Repairs were made to 8,977 square feet, principally around the salient point near the middle of the revetment, at a cost of $553.23, divided as follows:

65 tons of rock, at $2.75	$178.75
Provisions	114.00
Pay rolls	260.48
Total	553.23

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Installation.—The proportion of installation expenses, for transferring plant from New Orleans to the works, amounted to $481.25

The total cost of the work in Bondurant Chute from May 1, 1909, to May 1, 1910, was $5,655.65, distributed as follows:

Constructing and sinking mats	$722.59
Grading bank	392.88
Paving bank	3,270.25
Repairing pavement	553.23
Installation	481.25
Surveys	91.00
Care of plant	12.00
Office and administration	132.45
Total	5,655.65

Deducting the last two items, leaves $5,511.20 as the field cost of the work.

The field cost of the repairs and maintenance of the revetment was $994.23, and the improvement $4,516.97.

The revetment in the chute now has a total length of 3,550 feet, 110 feet having been added at the lower end during the season. The work is believed to be in good condition and has been successful in protecting the levee in front of Lake Bruen.

The field work was in charge of Assistant Engineer E. B. Geddes, assisted by Junior Engineer Geo. C. Schoenberger and Superintendent J. R. Allen.

[BONDURANT.]

The amount expended from June 30, 1909, to June 30, 1910, is $4,000, distributed as follows:

Office expenses (main office)		$309.35
Other administrative expenses		17.45
Construction (hired labor):		
Materials	$1,271.79	
Wages	1,509.09	
Subsistence	714.32	
		3,495.20
Surveys		91.00
Care of plant		12.00
Steamer *Newton*		75.00
Total		4,000.00

In compliance with resolution of the Commission adopted April 9, 1906, there should be added to the above total cost for the year $329.71, for use and deterioration of plant, being a charge of 3 per cent per annum for use of plant and 4 per cent per annum for deterioration. During the year the total amount charged to the allotment for plant, for care and repair of plant during the lay-off season and at the engineer depot was $24,977.99, of which the pro rata share chargeable to the above work is estimated to be $479.58.

BONDURANT CHUTE REVETMENT.

Abstract of appropriations.

Act of Congress.	Allotted.	Amount.
Mar. 3, 1899 (sundry civil)	July 5, 1899	$10,000
Do	Mar. 26, 1900	10,000
June 13, 1902 (river and harbor)	July 12, 1902	10,000
Mar. 3, 1903 (sundry civil)	July 21, 1903	5,000
Apr. 28, 1904 (sundry civil)	Apr. 1, 1904	3,000
Mar. 3, 1905 (sundry civil)	Apr. 26, 1905	2,000
June 30, 1906 (sundry civil)	June 28, 1906	3,000
Do	Sept. 10, 1906	15,000
Mar. 2, 1907 (river and harbor)	Mar. 27, 1907	3,000
May 27, 1908 (sundry civil)	May 4, 1908	2,000
Mar. 4, 1909 (sundry civil)	Apr. 28, 1909	5,000
Total		68,000

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2. KEMPE BEND REVETMENT.

For history of this work, project, and details of its execution see current annual report of the Mississippi River Commission and annual reports of the Mississippi River Commission since 1900.

At date of last annual report the subaqueous work in the upper part of the bend had a total length of 11,146 feet, not including two pieces of mattress placed to protect a cave between stations 56 and 59 covering 300 feet of bank. The upper bank had been graded and paved from low water to different heights, varying from a stage corresponding to from 10 to 35 feet on the Vicksburg gauge for 6,350 feet, leaving 4,796 feet in the middle and at the lower end unpaved.

The project for the expenditure of the allotment of $25,000 made for this work and approved by the Acting Secretary of War April 28, 1909, provided for extending the subaqueous revetment upstream to protect the bank where caving had been active the past year, to remove old mats above low water lying at too steep an angle or which had rotted away, and grade and pave with rock, and make general repairs to the revetment wherever found necessary. An additional allotment of $40,000 was made for this work and approved by the Acting Secretary of War September 13, 1909. The project for the expenditure of this allotment provided for revetting the lower end of the bend to protect the bank where caving was active in order to hold the present levee line, as far as available funds would permit.

The hydrographic survey completed in November indicated no changes of importance in the channel along the revetment, and the work generally appeared in good condition except for a cave in the pocket at the lower end which destroyed about 300 feet of mattress. Caving, however, had continued in the bend below the revetment and was already threatening the controlling levee line at the lower end on Stockridge and Mellwood plantations. No serious caving occurred above the revetment, and it was not found necessary to extend the revetment upstream.

Operations were commenced in Kempe Bend October 13, 1909, when grader *No. 1* was moved to the bend and grading commenced at cave in pocket near section 1½. The sinking plant in Giles Bend was moved to Kempe Bend November 7, 1909, and the sinking of mats at the lower end commenced November 11, 1909. Work was continued until January 27, 1910, when the high stage of the river prevented any further work being done.

As a result of the season's work on the first project the break in the revetment near section 1½ was mattressed about 300 feet wide for 315 feet and the upper bank graded; 9,000 square feet of paving repaired between sections 3 and 18, covering about 1,000 linear feet of bank. On the second project the bank at the lower end of the bend was mattressed 300 feet wide for 2,105 feet, commencing at station 301 plus 60, which is on Stockridge plantation, 9,060 feet, measured along the base line, below the lower end of the upper work. The upper bank was graded for 2,105 linear feet and paved for 2,040 linear feet. The pavement was carried to a height corresponding to 35 feet on the Vicksburg gauge for 1,070 feet at the upper end, and to a height corresponding to 25 feet on the Vicksburg gauge for 970 feet at the lower end.

Rock.—The rock required for this work was partly on hand stored on the bank in Giles and Kempe Bends and partly delivered by contract at Vidalia for $2.25 and $2.45½ per ton loaded on United States barges. The cost of towing is included under the head of "Steamers and tugs" for each work where rock was used.

Constructing mats.—The mats used in Kempe Bend and Giles Bend were of the framed type and constructed on Kempe Island, opposite Kempe Bend, and Disharoon or Hardscrabble bar, about 25 miles above Kempe Bend. The construction of mats for Giles Bend was commenced on Kempe Island September 16, 1909, and completed October 30, 1909. After completing the Giles Bend mats the building of mats for Kempe Bend was commenced and continued on Kempe Island until November 15. On November 16 the construction plant was moved to Disharoon bar, where construction was continued until December 17. On December 18 the plant was moved back to Kempe Bend and some additional mats built on Kempe Island for Kempe and Giles. All the mats required for the season's work were completed on January 7, 1910.

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Mats were constructed for Kempe Bend and Giles Bend as follows:

	Square feet.
Kempe Bend	681,385
Giles Bend	532,945
Total	1,214,330

In addition to mats constructed for Kempe and Giles, 10,395 square feet were constructed for Bondurant Chute, making a total constructed during the season of 1,224,725 square feet.

The following is the detailed cost of constructing the 1,214,330 square feet for Kempe Bend and Giles Bend:

Steamers and tugs	$1,857.00
5,000 feet b. m. miscellaneous lumber	60.00
421,507 feet b. m. 2 by 4 inch lumber	5,561.42
166,107 feet b. m. 3 by 6 inch lumber	2,168.08
11,100 pounds 9-inch wire nails	268.46
41,700 pounds 6-inch wire nails	861.31
9,300 pounds 4-inch wire nails	200.08
3,700 pounds No. 12 galvanized wire	88.04
112,000 treenails	318.85
252.51 acres willows	505.02
Miscellaneous	489.37
Teams	5,040.00
Provisions	3,222.44
Pay rolls	16,753.48
Total	37,393.55
Total square feet built	1,214,330
Cost per square foot	$0.03079

Of this total 681,385 square feet was used at Kempe Bend, valued at $20,982.32.

Towing mats.—The mats built at Disharoon bar were towed about 25 miles and the cost was as follows:

Tug *Tunica*, 3 days, at $29	$87.00
Tug *Marengo*, 6 days, at $26	156.00
Steamer *Tensas*, 10 days, at $26	260.00
Total	503.00
Square feet of mats towed	374,995
Cost per square foot	$0.00134

The mats built on Kempe Island had to be towed only across the river for the lower work in Kempe Bend, and no additional expense was incurred for towing.

Sinking mats.—It required 79,420 square feet of mattress to repair the break at section 1½ and 601,965 square feet to mattress the 2,105 feet of bank at the lower end of the bend. The following is the detailed cost of this part of the work:

Steamers and tugs	$1,925.00
Lumber, wire, nails, etc	187.60
2,087 tons rock, at $2.25	4,695.75
2,080 tons rock, at $2.45½	5,106.40
Miscellaneous	136.79
Provisions	1,082.04
Pay rolls	3,514.68
Total	16,648.26
Total square feet sunk	681,385
Cost per square foot to sink	$0.02443
Total cost per square foot in place	$0.05656

Grading bank.—The grading was done by grader *No. 1*, the bank being dressed also by hand where necessary. The material was mostly stiff clay on top, with

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layer of sand at bottom. There were graded in the pocket at section 1½ 464 linear feet of bank and 2,105 linear feet at the lower end of the bend.

The following is the detailed cost:

Hydraulic grader *No. 1:*	
Steamers and tugs	$232.00
Coal	550.00
Miscellaneous	353.00
Provisions	448.84
Pay rolls	2,317.56
Hand grading (labor and provisions)	482.57
Total	4,383.57
Linear feet of bank graded	2,569
Cost per linear foot to grade	$1.70

Paving bank.—A total of 165,665 square feet or 2,040 linear feet were paved with rock on the lower revetment. Of this 1,070 feet was carried to about a 35-foot stage and 970 feet to about a 25-foot stage.

The following is the detailed cost of this work:

Steamers and tugs	$1,274.00
5,313 tons of rock, at $2.50	13,282.50
493 tons of spalls, at $2.75	1,355.75
Miscellaneous	15.00
Provisions	726.00
Pay rolls	1,972.53
Total	18,625.78
Total square feet paved	165,665
Cost per square foot	$0.1124

Repairing pavement.—Repairs were made to the upper bank work between sections 3 and 18. A total of 9,000 square feet were repaired, the detailed cost being as follows:

Steamers and tugs	$116.00
82 tons rock	205.00
Provisions	88.00
Pay rolls	286.13
Total	695.13

Clearing.—The timber along the river bank between the upper and lower revetments for 4,000 feet was felled about 200 feet back from the river bank to prevent obstructing future work; and the logs and trees removed along the bank graded at section 1½, at a cost of $288.21.

Installation.—The proportion of installation expenses charged to this work amounted to $2,380.

The total cost of the work in Kempe Bend from May 1, 1909, to May 1, 1910, was $72,674.28, distributed as follows:

Constructing mats	$20,982.32
Towing mats	503.00
Sinking mats	16,648.26
Grading bank	4,383.57
Paving bank	18,625.78
Repairing pavement	695.13
Clearing	288.21
Installation	2,380.00
Surveys	1,128.50
Steamer *Newton*	375.00
Care of plant	1,124.84
Repairs to plant	1,601.11
New plant	1,010.87
Office and administration	2,927.69
Total	72,674.28

Deducting last five items leaves $65,634.77 as the field cost of this work.

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The field cost of repairs and maintenance of the revetment was $7,823.63 and the improvement $57,811.14.

The subaqueous revetment in Kempe Bend now has a total length of 13,251 feet in two pieces—upper 11,146 feet long and lower 2,105 feet long, separated by an unprotected gap about 9,560 feet long, measured along the present base line. The upper bank of the upper revetment has been paved to different heights for 6,500 feet, and the lower revetment for 2,040 feet. Generally the bank where scour is likely to take place above the mats has been paved and the work as a whole appears to be in good condition and accomplishing the purpose for which constructed, viz, to protect the present levee line, the destruction of which would require the building of a long and very expensive line.

The field work was in charge of Assistant Engineer E. B. Geddes, assisted by Junior Engineer Geo. C. Schoenberger and Superintendent J. R. Allen.

[KEMPE BEND REVETMENT.]

The amount expended from June 30, 1909, to June 30, 1910, is $63,703.01, distributed as follows:

Office expenses (main office)		$625.00
Other administrative expenses		3,188.34
Construction (hired labor):		
Materials	$18,947.90	
Wages	23,488.03	
Subsistence	5,737.24	
		48,173.17
Surveys		1,128.50
Repairs to plant		6,556.00
Care of plant		2,343.67
New plant		1,313.33
Steamer *Newton*		375.00
Total		63,703.01

In compliance with resolution of the commission adopted April 9, 1906, there should be added to the above total cost for the year $6,049.63 for use and deterioration of plant, being a charge of 3 per cent per annum for use of plant and 4 per cent per annum for deterioration. During the year the total amount charged to the allotment for plant, for care and repair of plant during the lay-off season, and at the engineer depot was $24,977.99, of which the pro rata share chargeable to the above work is estimated to be $6,953.87.

KEMPE BEND REVETMENT.

Abstract of appropriations.

Act of Congress.	Allotted.	Amount.
Mar. 3, 1899 (sundry civil)	Mar. 13,1900	$180,000
June 6, 1900 (sundry civil)	July 14,1900	150,000
June 13, 1902 (river and harbor)	July 12,1902	60,000
Mar. 3, 1903 (sundry civil)	July 21,1903	64,000
Do	By transfer..	30,000
Apr. 28, 1904 (sundry civil)	Apr. 1,1904	80,000
Mar. 3, 1905 (river and harbor)	Apr. 26,1905	90,000
June 30, 1906 (sundry civil)	June 28,1906	50,000
Mar. 2, 1907 (river and harbor)	Mar. 27,1907	12,000
May 27, 1908 (sundry civil)	By transfer..	25,000
Mar. 4, 1909 (sundry civil)	Apr. 28,1909	65,000
Total		806,000

3. HARBORS OF NATCHEZ AND VIDALIA.

For history of this work, project, and details of its execution, see current annual report of the Mississippi River Commission and previous annual reports of the Mississippi River Commission.

The harbors at Natchez and Vidalia include improvement works in Giles Bend and along Natchez Front.

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At the date of the last annual report the condition of the works was as follows:

The total length of the revetment complete and incomplete in Giles Bend was 21,848 feet in two detached pieces—upper 8,592 feet and lower 13,256 feet. The gap of unprotected bank between the two pieces of revetment was about 1,400 feet, measured parallel to the general direction of the shore line.

After the water had fallen below the top of the banks serious caving commenced in the lower work and around some of the spurs. The first cave occurred on April 15 opposite the upper rock pile, near section 20. It was about 300 feet long and destroyed 217 tons of rock. Later on almost continuous caving took place from opposite station 210 to station 225, and from station 239 to station 246. Altogether over 3,000 feet of the lower revetment was partially or wholly destroyed, the recession of the bank line being as much as 200 feet near section 25.

The survey completed September 25 showed deepening of the channel generally, where caving occurred of from 10 to 20 feet, since the survey one year ago. Along the upper work there was but little change in the channel, but some scour had taken place between and around the spurs inside the mats where the upper bank had not been protected by pavement.

Under project approved August 7, 1907, the bank along the front of the city of Natchez was revetted with mattresses for a length of 2,550 feet in two detached pieces separated by about 2,000 feet of unprotected bank. Soundings completed over the work early in the season showed no changes in the channel, and so far as could be determined the work was in good condition.

(a) GILES BEND.

The approved project for the expenditure of the allotment for this work provided for grading and paving the upper bank of the lower revetment in Giles Bend, in extending this revetment upstream to close the gap of unprotected bank between the two sections of revetment as far as available funds would permit, and make such repairs as were found necessary after the high water.

After the decline of the high water of 1909 it became evident that the revetment in Giles Bend was in bad condition, and that only necessary repairs could be made with the amount available. The plant for the work had to be towed up from the engineer depot at New Orleans, and it was not until September 7, 1909, that it had all been assembled in Giles Bend.

On September 16 the construction of mats was commenced at Kempe Island for this work, and grading and paving the bank near section 20, where the first cave occurred, was commenced on the same date. Operations were continued until November 7, when the plant was all moved to Kempe Bend. The plant was returned to Giles Bend January 27, and work carried on until February 11, when all work was closed down and the last tow taken to laying-up quarters in New Orleans.

As a result of the season's work in Giles Bend the break at section 20 was mattressed about 250 feet wide for a length of 325 feet; 1,700 linear feet mattressed 250 feet wide between sections 22 and 26; the upper bank at sections 20 and 23 graded for 833 linear feet and paved with rock for 649 linear feet; repairs made to 29,800 square feet, covering 800 linear feet of pavement along the lower work; 35 acres of bank cleared of trees and logs; ditches dug and opened up, and the Cowpen Point levee cleared of weeds and brush, and some holes and washed places filled and resodded.

Rock.—The rock used on this work was delivered by contract at Vidalia loaded on United States barges for $2.25 per ton.

Constructing mats.—The mats for Giles Bend were constructed on Kempe Island; 532,945 square feet, valued at $16,411.23, being required for this work. For further details, see report for Kempe Bend.

Towing mats.—The mats had to be towed about 20 miles, and the cost was:

Tug *Tunica*, 3 days, at $29	$87.00
Tug *Marengo*, 15 days, at $26	390.00
Total	477.00
Cost per square foot	$0.00089

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Sinking mats.—It required 76,350 square feet to mattress the break at section 20; 431,065 square feet to repair breaks between sections 22 and 26; one piece containing 5,000 square feet was used to protect the upper end of the lower work, and 20,530 square feet to protect faults in the revetment at sections 16 and 17. The following is the detailed cost:

Steamers and tugs	$620.00
Lumber, wire, nails, etc	149.12
3,370 tons of rock, at $2.25	7,582.50
Miscellaneous	130.31
Provisions	866.93
Pay rolls	3,570.55
Total	12,919.41
Total square feet sunk	532,945
Cost per square foot to sink	$0.02424
Total cost per square foot in place	$0.05592

Grading bank.—A total of 83,475 square feet, or 833 linear feet, was graded by grader *No. 1* at sections 20 and 23. In addition 9,000 square feet were graded by hand. The cost was as follows:

Grading by grader *No. 1*	$1,422.06
Grading by hand	152.40
Total	1,574.46

Paving bank.—A total of 64,345 square feet, or 649 linear feet, was paved near sections 20 and 23 with rock. The cost was as follows:

Steamers and tugs	$464.00
1,961 tons of rock, at $2.25	4,412.25
Miscellaneous	40.00
Provisions	203.00
Pay rolls	1,245.22
Total	6,364.47

Repairing pavement.—A total of 29,800 square feet of pavement along the lower revetment was regraded and repaved with rock. The cost was as follows:

Steamers and tugs	$174.00
514 tons of rock, at $2.25	1,156.50
Miscellaneous	20.00
Provisions	125.00
Pay rolls	553.99
Total	2,029.49

Clearing.—Clearing bank for grader and felling timber along unprotected bank cost $126.27.

Drainage.—Ditches were cut at the outer end of the levee to drain borrow pits, and other drainage ditches opened up at a cost of $48.75.

Repairing Cowpen Point levee.—About 6,000 feet of the levee was cleared of brush and weeds and all washed places repaired at a cost of $254.65.

Installation.—All plant belonging to the up-river works had to be towed from New Orleans to Giles Bend, 277 miles, and returned to same place after completing season's work. The cost of this towing and incidental expenses incurred commencing operations have been charged as usual under the head of installation. The total cost of this item amounts to $5,842.92, of which $2,781.67 has been charged against Giles Bend, made up of the following charges:

Tunica, 28 days, at $29	$812.00
Marengo, 11 days, at $26	286.00
Wynoka, 9 days, at $131	1,179.00
Newton	185.83
Services at depot and Giles Bend	318.84
Total	2,781.67

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The total cost of the work in Giles Bend from May 1, 1909, to May 1, 1910, was $48,240.56, divided as follows:

Constructing mats	$16,411.23
Towing mats	477.00
Sinking mats	12,919.41
Grading bank	1,574.46
Paving bank	6,364.47
Repairing pavement	2,029.49
Clearing	126.27
Drainage	48.75
Repairing levee	254.65
Installation	2,781.67
Surveys	1,197.74
Miscellaneous and *Newton*	192.93
Care of plant	365.53
Repairs to plant	102.97
New plant	1,286.81
Office and administration	2,107.18
Total	48,240.56

Deducting the last five items leaves $44,185.14 as the net or field cost of the work.

At the close of the season's work there was on hand material for future construction valued at $1,759.44.

No extension of the revetment in Giles Bend was made during the season, all the work done being in the nature of maintenance and repair of the lower revetment.

The revetment now has a total length of 21,848 feet, in two pieces—the upper 8,592 feet long, and the lower 13,256 feet long. The gap of unprotected bank between the revetments is now about 1,400 feet. The total length of bank paved is now about 11,000 linear feet, leaving 10,848 linear feet unpaved, mostly along the upper work.

The field work was in charge of Assistant Engineer E. B. Geddes, assisted by Junior Engineer George C. Schoenberger and Superintendent J. R. Allen.

[GILES BEND.]

The amount expended from June 30, 1909, to June 30, 1910, is $50,000, distributed as follows:

Office expenses (main office)		$959.65
Other administrative expenses		1,147.53
Construction (hired labor):		
Materials	$4,925.84	
Wages	23,249.45	
Subsistence	16,571.55	
		44,746.84
Surveys		1,197.74
Repairs to plant		102.97
Care of plant		365.53
New plant		1,286.81
Clearing levee		85.00
Steamer *Newton*		107.93
Total		50,000.00

In compliance with resolution of the commission adopted April 9, 1906, there should be added to the above total cost for the year $4,671.81, for use and deterioration of plant, being a charge of 3 per cent per annum for use of plant and 4 per cent per annum for deterioration. During the year the total amount charged to the allotment for plant, for care and repair of plant during the lay-off season and at the engineer depot, was $24,977.99, of which the pro rata share chargeable to the above work is estimated to be $5,515.14.

(*b*) NATCHEZ FRONT.

No work was undertaken along the Natchez front during the year, as the work placed the previous year appeared to be in good condition, and no extension of the work was contemplated. The hydrographic survey over the com-

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pleted work made during the season developed no changes of consequence in the channel, and it is believed all the work placed at this locality is still in good condition.

The material (rock) now on hand for this work is valued at $2,000.

The revetment along the Natchez front covers a total length of 2,550 feet in two pieces, the upper 1,150 feet and the lower 1,400 feet long.

Abstract of appropriations.

Act of Congress.	Allotted.	Amount.
Harbors of Natchez and Vidalia:		
June 16, 1880 (sundry civil)		$40,000.00
Mar. 3, 1881 (river and harbor)		50,000.00
July 13, 1892 (river and harbor)		80,000.00
Aug. 18, 1894 (sundry civil)		80,000.00
June 3, 1896 (river and harbor)	June 27, 1896	64,000.00
Mar. 3, 1899 (sundry civil)	Mar. 13, 1899	50,000.00
June 13, 1902 (river and harbor)	July 12, 1902	60,000.00
Mar. 3, 1903 (sundry civil)	July 21, 1903	12,000.00
Mar. 3, 1905 (sundry civil)	Apr. 26, 1905	40,000.00
June 30, 1906 (sundry civil)	June 28, 1906	50,000.00
Mar. 2, 1907 (river and harbor)—		
For Giles Bend, $75,000	July 12, 1907	165,000.00
For Natchez front, $90,000[a]		
May 27, 1908 (sundry civil)—		
For Giles Bend	May 4, 1907	75,000.00
Mar. 4, 1909 (sundry civil)	Apr. 28, 1909	50,000.00
Received from sales, blueprints		2.10
		816,002.10
Prevention of cut-off at Giles Bend, La.:		
June 4, 1897 (sundry civil)	July 10, 1897	[b] 110,000.00
June 6, 1900 (sundry civil)	July 14, 1900	150,000.00
		260,000.00
Emergencies in river and harbor works—Allotment for "Mississippi River at Giles Bend:"		
Apr. 28, 1904 (sundry civil)	July 6, 1904	40,000.00
Grand total		1,116,002.10

[a] Original allotment, $100,000; $10,000 transferred to Atchafalaya and Red rivers, Louisiana.

[b] Original allotment, $150,000; $40,000 transferred to harbor at New Orleans.

4. IMPROVING ATCHAFALAYA AND RED RIVERS, LA.

For history of this work, project, and details of its execution, see current annual report of the Mississippi River Commission and previous reports of the Mississippi River Commission.

The work contemplated for the past season was to repair and maintain the dredge *The Ram*, and to do such dredging as might be necessary to maintain low-water navigation between the Mississippi, Red, and Atchafalaya rivers through lower Old River.

The high water of 1909 did not commence to decline until the middle of July. On August 9, *The Ram* was placed in commission and left the engineer depot at New Orleans, with fuel barge and other necessary plant in tow, arriving at the mouth of Old River on August 14. The necessary ranges were set and the dredge placed in position for dredging a channel through the bar at the Mississippi entrance to Old River. Dredging commenced on August 17. On this date the Red River Landing gauge read 22.4, and the Barbres gauge 20.4, the least depth of water over the bar being 9 feet. The dredge was operated with a single crew until August 24, when an additional crew was placed aboard, and *The Ram* operated night and day until October 9. The performance of the dredge was excellent, and although the river declined until the Red River Landing gauge read 5.4 and the Barbres 3.1, navigation, even for the railroad-transfer plant, was not interrupted or even impeded at any time. On October 9 there was a least depth in the dredged channel of 12 feet, and operations on the bar at the Mississippi entrance to Old River were suspended, although it was not certain that further dredging would not be necessary before high water. Complaint having been made by the navigation interests of shoal water in the Mississippi just below the mouth of Old River, and it being necessary for *The*

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Ram to remain in commission pending a rise or fall of the river, it was decided to operate the dredge in an endeavor to cut a channel through what is known as Angola bar. Dredging was commenced on October 13, and continued until November 4, but operations were not entirely successful, *The Ram* not having sufficient capacity to deal with the rapid accumulation of sand in the Mississippi River.

On November 5, *The Ram* was moved to the location of the mud lumps or ridges in the channel of Old River, and dredged at that locality until November 19, when the rising river rendered further operations unnecessary. On November 20, *The Ram* was temporarily transferred to Lieut. Col. Lansing H. Beach, for service on works in his charge, remaining in that service until February 13, 1910, when she returned to the engineer depot. The usual repairs to make good wear and tear of the season's work were made to the dredge, and on April 8, 1910, *The Ram* was again temporarily transferred to Lieutenant-Colonel Beach, for service on works in his charge.

During the low-water season of 1908 considerable complaint was made of the obstruction to navigation caused by the mud lumps or ridges in the channel of Old River about one-half mile west of the Texas and Pacific Railroad bridge. During that season an attempt to dredge them away with *The Ram* was made, but on account of the nature of the material, a putty-like clay, slow progress was made by the hydraulic method of dredging. It was decided to attempt the removal of these ridges with a bucket dredge. The levee-building machine or dredge *Barataria* was placed in commission with a double crew and left the engineer depot at New Orleans, in tow of the tug *Morganza*, on August 17, arriving at Old River on August 21. Dredging of the ridges was commenced at once and continued until September 16, when all work practicable at the stage of the river having been completed, dredging was suspended and the *Barataria* returned to New Orleans. The bucket dredge operated very successfully on the lumps or ridges, removing about 15,700 cubic yards of material during the time that she was engaged. No complaint of these obstructions has been made during the low-water season of 1909.

As a summary it may be stated that operations for the maintenance of low-water navigation between the Mississippi, Red, and Atchafalaya rivers were successful. Besides the efficiency of the dredging plant, the principal contributing cause to this result was the fixed direction of the current through Old River, which remained constant from the Mississippi toward the Atchafalaya from September 1, 1908, to January 8, 1910. From January 8 to 16, there was practically no current in Old River, and on the latter date it again commenced flowing toward the Atchafalaya and has continued until the date of this report.

The annual surveys of Old River, over the sill dams in the Atchafalaya, and of the Mississippi in the vicinity of the entrance to Old River, have been completed. For Old River the usual table of average areas and widths, maximum and mean depths, referred to a plane 35 feet above the zero of the Barbres gauge, has been compiled and is summarized as follows:

COMPARISONS 1894 AND 1908.

Year.	Average area.	Average width.	Average maximum depth.	Average mean depth.
	Square feet.	*Feet.*	*Feet.*	*Feet.*
1894	20,901	793	46.8	26.6
1908	20,543	691	46.5	29.6
Decrease	358	102	.3	
Increase				3.0

COMPARISONS 1908 AND 1909.

1908	20,543	691	46.5	29.6
1909	25,413	728	56.9	35.1
Increase	4,870	37	10.4	5.5

It appears from these tables that there has been a marked enlargement of Old River since the survey of September, 1908, and that prior to that time the tendency was in the direction of decrease in area and toward a uniformity of cross section.

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At the sill dams and above, between, and below the changes are set forth in the table following:

COMPARISONS 1894 AND 1909.

Section.	1894 and 1908.				1908 and 1909.				1894 and 1909.			
	Change in area.	Change in width.	Change in maximum depth.	Change in mean depth.	Change in area.	Change in width.	Change in maximum depth.	Change in mean depth.	Change in area.	Change in width.	Change in maximum depth.	Change in mean depth.
	P. ct.	*Feet.*	*Feet.*	*Feet.*	*P. ct.*	*Feet.*	*Feet.*	*Feet.*	*P. ct.*	*Feet.*	*Feet.*	*Feet.*
6 (400 feet above Dam No. 1)	−22.0	−68.0	0.0	−1.9	+ 2.6	−28.0	0.0	+1.0	− 8.7	−65.0	0.0	−0.1
11 (on Dam No. 1)	− 1.3	−15.0	0.0	+0.1	+14.5	+27.0	0.0	+1.1	+30.7	+ 2.0	+5.0	+2.7
21 (between Dams Nos. 1 and 3)	−35.6	−48.0	−10.0	−6.6	−17.0	−15.0	−15.0	−4.6	− 6.2	−43.0	0.0	0.0
34+50 (on Dam No. 3)	−13.6	−27.0	0.0	−2.0	− 4.7	− 3.0	0.0	−1.1	− 6.7	−20.0	0.0	−0.8
46 (800 feet below Dam No. 3)	−18.6	−45.0	− 5.0	−3.6	+ 5.5	+22.0	+ 5.0	+0.9	+15.9	+57.0	0.0	+2.7

It is believed that a succession of extreme floods causes a scour and a succession of moderate floods a fill. For illustration, the survey of 1894 was made after the succession of floods of 1890–93. If we take a survey made in 1903, prior to the flood of that year and after the succession of moderate floods of 1900, 1901, and 1902, we find the following:

COMPARISONS 1894 AND 1903.

Section.	Change in area.	Change in width.	Change in maximum depth.	Change in mean depth.
	Per cent.	*Feet.*	*Feet.*	*Feet.*
6 (400 feet above Dam No. 1)	−151.8	−70.0	−10.0	− 9.7
11 (on Dam No. 1)	− 2.4	+15.0	0.0	− 0.4
21 (between Dams Nos. 1 and 3)	−102.1	−82.0	−15.0	−13.8
34 + 50 (on Dam No. 3)	− 16.9	−42.0	0.0	− 2.0
46 (800 feet below Dam No. 3)	− 59.0	−95.0	−15.0	−10.0

It is evident that if we take the conditions existing during 1894 as a basis for comparison, that the changes have been generally in the direction of fill rather than scour during the fifteen years from 1894 to 1909.

In the Mississippi River in the vicinity of the mouth of Old River the survey of 1909 indicates a disposition of the river during low stages to shift its channel from the Torras to the Angola side. Should this continue and the entrance to Old River be placed on the convex instead of the concave side of the Mississippi, the resulting bar formation will probably cause increased difficulty in maintaining a low-water channel into Old River.

The work was under the direction of Assistant Engineer H. S. Douglas.

[ATCHAFALAYA AND RED RIVERS, LA.]

The amount expended from June 30, 1909, to June 30, 1910, is $15,507.82, distributed as follows:

Office expenses (main office)		$625.00
Other administrative expenses		499.82
Dredging Old River:		
Materials	$2,286.48	
Wages	4,112.19	
Subsistence	2,040.95	
		8,439.62
Surveys		1,342.36
Repairs to plant		4,284.35
Care of plant		64.04
New plant		208.09
Steamer Newton		44.54
Total		15,507.82

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In compliance with resolution of the Commission, adopted April 9, 1906, there should be added to the above total cost for the year $2,432.36 for use and deterioration of plant, being a charge of 3 per cent per annum for use of plant and 4 per cent per annum for deterioration.

Abstract of appropriations.

Act of Congress.	Allotted.	Amount.
Mouth of Red River, La.:		
June 18, 1878 (river and harbor)		$150,000 00
Mar. 3, 1879 (sundry civil)		40,000 00
July 5, 1884 (river and harbor)	Aug. 5, 1884	[a] 11,392 00
Do	By transfer	10,500 00
Do	do	1,400 00
Do	Aug. 19, 1884	15,000 00
		228,292 00
Rectification of Red and Atchafalaya rivers:		
Aug. 5, 1886 (river and harbor)		187,500 00
Aug. 11, 1888 (river and harbor)		250,000 00
Sept. 19, 1890 (river and harbor)	Oct. 15, 1890	[b] 217,000 00
Do	By transfer	3,000 00
July 13, 1892 (river and harbor)		80,000 00
Aug. 18, 1894 (sundry civil)		[c] 70,000 00
June 3, 1896 (river and harbor)	June 27, 1896	40,000 00
Mar. 3, 1899 (sundry civil)	Mar. 13, 1899	25,000 00
June 13, 1902 (river and harbor)	July 12, 1902	15,000 00
Do	Oct. 17, 1904	1,000 00
Mar. 3, 1905 (sundry civil)	Apr. 26, 1905	24,000 00
Settlement by Navy Department	Feb. 6, 1907	8,666 42
May 27, 1908 (sundry civil)	Nov. 3, 1908 ($1,500)	(d)
Do	By transfer	10,000 00
Mar. 4, 1909 (sundry civil)	Apr. 28, 1909	25,000 00
		956,166 42
Emergencies in river and harbor works, "Old River:"		
Mar. 3, 1905 (river and harbor)	Oct. 5, 1908	6,000 00
Do	Nov. 12, 1908	4,000 00
		10,000 00
Grand total		1,194,458 42

[a] Original allotment, $12,290; $900 transferred to harbor at New Orleans.
[b] Original allotment, $225,000; $8,000 transferred to harbor at New Orleans.
[c] $2,500 expended improving Bayou des Glaises.
[d] Original allotment, $1,500; transferred to plant, fourth district.

5. NEW ORLEANS HARBOR.

For history of this work, project and details of its execution, see current annual report of the Mississippi River Commission and previous annual reports of the Mississippi River Commission.

For general map, showing location of works of improvement in New Orleans Harbor, see Plate V, Annual Report for 1905, opposite page 280.

At the date of the last report the aggregate length of bank protected in whole or in part was 31,915 linear feet, all of the work being in good condition, as far as was known.

The work projected for the past season was to extend existing revetment in the Carrollton Bend downstream about 3,333 linear feet, from Fern street to Lowerline street, with mattresses 300 feet wide, and to maintain and repair existing revetments.

Field work of the season 1909–10 commenced on August 24, when the quarter boat *New Orleans* was placed in commission and left the engineer depot in tow of the steamer *Gen. John Newton*. The quarter boat arrived at State Line bar (Mississippi and Louisiana) on August 28, and the cutting of brush, construction of mattress ways, etc., was at once commenced. Mattress construction was begun on September 24 and continued until December 11, on which date all mattress work practicable to place with existing funds had been completed. During this interval it was necessary to transfer the force from State Line to Lum's bar, about 3 miles above and opposite. At Lum's bar a second set of ways were built, to utilize the brush in that vicinity. The first tow of mattresses left State Line bar on October 1, 1909, and the last tow arrived in New

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Orleans on December 17, 1909. On October 18 the quarter boat *Gamma* was placed in commission for sinking the mattresses in revetment, and on October 21 the first mattress was successfully sunk in place. From November 7 to 24 sinking was suspended, and the *Gamma* with her force temporarily transferred to Lum's bar, to assist in mattress construction. The *Gamma* was returned to New Orleans on November 24, and sinking of mattresses resumed. On December 23 the last mattress was sunk in place, and after drying lines, painting cables, etc., all of the plant was put out of commission on December 30, 1909. The entire working season was devoid of incident worthy of remark, except that no accidents occurred and that river and weather conditions were exceedingly favorable.

Mattress construction.—An inspection of bars below Natchez was made in the latter part of February, 1909, for the purpose of locating sufficient brush for the season's work of 1909–10. This inspection developed the fact that large areas of brush were exceedingly scarce, and that in order to obtain a sufficient quantity of brush for one season's work it would be necessary to either build several sets of ways at different places or to establish one or two sets of ways at convenient places and transport the brush from outlying bars to the ways on barges. The latter method was considered the most economical, and accordingly a derrick for loading brush was installed on a barge. It was found that by taking all available brush from both banks of the river between Fort Adams and the mouth of Red River and using both willow and cottonwood saplings that sufficient brush could be obtained for the season's work. This reach had the further advantage of containing two bars with a sufficient area of brush to justify the building of ways. These two bars were at Lum's, just below Point Breeze, and at State Line (Mississippi and Louisiana), just above the mouth of Old River. The quarter boat *New Orleans*, with necessary superintending personnel aboard, arrived at State Line Bar on August 28. Ordinary labor was easily obtained, and operations were commenced at once. On October 23 the quarter boat was moved to Lum's bar and operations continued at that place until November 24, when operations were resumed at State Line, and continued at that locality until December 11, when mattress construction was suspended for the season on account of lack of funds. The total elapsed time from the day that the quarter boat arrived at State Line bar until the last mattress was launched was 106 days, and during this period of time 1,155,000 square feet of mattress was constructed, the detail of the field cost being as follows:

147,980 feet b. m. 3 by 6 inch lumber	$2,200.00
392,678 feet b. m. 2 by 4 inch lumber	5,850.00
8,325 feet b. m. miscellaneous lumber	120.00
15,500 pounds 9-inch steel wire nails	340.00
30,700 pounds 6-inch steel wire nails	615.00
6,300 pounds 4-inch steel wire nails	125.00
4,800 pounds No. 10 galvanized wire	105.00
12,000 cords brush	17,040.00
5,000 9-inch tree nails	10.00
89,000 6-inch tree nails	215.00
Steamer *Tensas*, 86 days, at $24	2,064.00
Tug *Manchac*, 31 days, at $23.50	728.50
Miscellaneous	131.38
Provisions	4,344.00
Pay rolls, service	10,517.85
Total	44,405.73

Cost per square foot for construction of mattress, $0.03671.

Brush.—The item of 12,000 cords of brush given in the foregoing table is analyzed as follows:

Cutting and piling, building roads, etc	$11,970.59
Transportation to ways	4,349.41
Privilege of cutting brush	720.00
Total	17,040.00
Estimated cords of brush used	12,000
Cost per cord delivered at ways	$1.42

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Of the 12,000 cords used, 8,800 cords were cut from State Line and Lums bars and hauled direct to the ways on wagons. The cost per cord delivered at the ways was $1.405.

The remaining 3,200 cords were cut at Point Breeze, Buffalo Bayou, Clarks Lake, and Carrs Point. This brush was loaded on barges which were towed to the nearest convenient ways at either Lums or State Line bars. The cost per cord delivered at the ways was $1.462, to which should be added an indeterminate additional amount for handling the brush over the greater distance from the barge to the mattress than from wagons alongside the ways.

The derrick was found to be correct in principle, but can not be operated by hand power with sufficient rapidity to obtain the most economical results in loading brush on barges. Of course, additional barges are necessary, and the number required would increase with the distance that the brush had to be transported. In the present case all brush was obtained within a few miles of the ways. It was considered possible that the additional cost of brush delivered on barges would be partially, if not entirely, offset by the fact that, during such time as it was not practicable to haul over the roads, construction could continue by using the brush stored on barges. The season being an exceptionally dry one, the roads remained in good condition, and no economy of time resulted.

Ways.—Two sets of ways were built, one at State Line bar and one at Lums bar. Their cost is included in the mattress construction, but is separated and analyzed as follows:

Lumber and nails	$150.00
Labor and superintendence	514.00
Total	664.00
Average cost of each set	332.00

Towing.—As has been customary, the expense of towing lumber and other materials has been added to and is included in the cost of such materials delivered at the site of the work. Towing of mattresses is given below (1,155,000 square feet from State Line to New Orleans, 196 miles).

The cost of towing mattresses for the distance stated was:

Steamer *Ramos*, 19 days, at $35 (single crew)	$665.00
Steamer *Ramos*, 44 days, at $63 (double crew)	2,772.00
Tug *Morganza*, 32 days, at $33	1,056.00
Total for 1,155,000 square feet mattress	4,493.00
Cost per square foot for towing	$0.00389

Sinking.—The quarterboat *Gamma* was placed in commission on October 15, and the sinking plant swung into position on October 19. The first mattress was successfully sunk in place on October 21. The sinking of mattresses progressed rapidly, and on November 6 all mattresses that had been towed down to the harbor were sunk. The *Gamma* with her force was temporarily transferred to Lums bar to assist in mattress construction. On November 24 the *Gamma* was returned to New Orleans Harbor and sinking of mattresses in revetment resumed. The last mattress was sunk in place on December 23, completing the season's work, the total field cost of sinking 1,155,000 square feet of mattress being as follows:

8,941 tons rock	$18,194.93
Lumber, wire, wire nails, etc	421.55
Steamers and tugs	2,087.00
Miscellaneous	40.15
Provisions	1,952.00
Pay rolls, services	5,354.66
Total for 1,155,000 square feet mattress	28,950.29
Cost per square foot to sink	$0.02507

Summarizing the field cost of construction, towing, and sinking the mattresses we have:

Construction of mattress, per square foot	$0.03671
Towing of mattresses, per square foot	.00389
Sinking of mattresses, per square foot	.02507
Total field cost, per square foot	.06567

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Rock.—Proposals for furnishing 7,500 tons of rock were opened on June 28, 1909, and contract awarded for delivery on United States barges in New Orleans Harbor at $2 per ton. Under this contract 4,868.65 tons were delivered prior to the completion of the work on December 23, 1909, and since that time the contractor has delivered 2,857.22 tons, making a total of 7,725.87 tons delivered under the contract. The failure of the contractor to deliver rock in time necessitated the loading of 1,416.57 tons from the reserve supply stored on the bank. In addition to this, 1,155.91 tons was purchased in open market, at $1.50 per ton. During the year there was obtained under contract and by purchase in open market 8,881.78 tons of rock, which, added to the 4,413.33 on hand May 1, 1909, gives a grand total of 13,295.11 tons. Of this, 8,941 tons has been used during the past season to ballast mattresses, leaving 4,354.12 tons on hand at the close of this report.

Installation.—The cost of towing the quarterboats to and from New Orleans and the willow bars, preliminary organization, general preparatory work, etc., was $839.94.

Surveys.—The usual annual surveys of the Greenville and Gouldsboro bends and of the third district reach have been made and have developed the following: In the Greenville Bend, comparing the surveys of 1906 and 1910, there has been marked scour of the bank from the head of the company's canal to section 9. Thence to section 19½ scour has been slight. Between sections 19½ and 20½ there has been marked scour. Thence to head of Harveys canal, including the revetment at Amesville, no changes of importance have occurred. In the Gouldsboro Bend, comparing the surveys of 1903 and 1909, there has been considerable scour between the spurs, this being especially marked between spurs 3½ and 4 and between 4½ and 5. In the third district reach a comparison of the surveys of 1906 and 1910 develops no change. The usual survey work incident to placing and locating mattresses in revetment was done by the constructing force. The cost of survey work charged to New Orleans Harbor was $647.51.

Plant.—On account of the allotment for care and repair of plant being exhausted, the cost of repairs to plant, care of same, and a proportion of the general expenses at the engineer depot since the completion of the season's field work had to be paid from the allotment for New Orleans Harbor. These items amount to $4,729.66.

Summary.—Thee hundred linear feet of the revetment placed in former years along the 60-foot contour was extended up to low-water mark with mattresses 100 feet wide, and the revetment was extended 3,655 linear feet downstream, with mattresses 300 feet wide, extending from low-water line to deep water in the channel. In all, 1,155,000 square feet of mattress, covering 3,955 linear feet of bank, was placed in the revetment of the Carrollton Bend, the total cost being as follows:

Construction of mattress, including cost of two sets of ways	$45,069.23
Towing of mattresses, 196 miles	4,493.00
Sinking of mattresses	28,950.29
Installation	839.94
Surveys	647.51
Rock, lumber, etc., on hand for future construction	10,420.03
Repairs to plant	2,845.63
Care of plant	1,884.03
New plant	3,123.64
Office expenses and administration	7,380.09
	105,653.39
Deduct value of material on hand for future work	10,420.03
Gross cost of season's work	95,233.36
Deduct repairs and care of plant, new plant, and office and administrative expenses	15,233.36
Net field cost of season's work	80,000.00
Gross cost per square foot for mattress in place in revetment	$0.0824
Gross cost per linear foot for revetment, 100 feet wide	8.24
Gross cost per linear foot for revetment, 300 feet wide	24.72
Net field cost per square foot for mattress in place in revetment	.0693
Net field cost per linear foot for revetment, 100 feet wide	6.93
Net field cost per linear foot for revetment, 300 feet wide	19.89

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(NOTE.—Such rock, lumber, etc., as was on hand at the close of last season, and used this year, is charged in the construction and sinking of mattresses.)

There have been no expenditures on account of repair and maintenance of existing revetment during the year.

The revetment in the Carrollton Bend has now a length of 13,330 linear feet, and consists of 7,340 linear feet of continuous mattress 250 feet wide, placed generally with its inshore edge along the 60-foot contour; 3,955 linear feet of continuous mattress 300 feet wide, extending from low-water mark to deep water in the channel; and 2,035 linear feet protected with 5 submerged sloping spur dikes in conjunction with continuous mattress. The aggregate length of bank protected in New Orleans Harbor in whole or in part, is now 35,715 feet. All of this work, as far as is known, is in good condition.

The field work was in charge of Assistant Engineer H. S. Douglas, assisted by Junior Engineers G. D. Waddill and T. M. McCarroll.

HARBOR AT NEW ORLEANS, LA.

The amount expended from June 30, 1909, to June 30, 1910, is $100,000 distributed as follows:

Office expenses (main office)		$2,245.69
Other administrative expenses		4,829.54
Construction (hired labor):		
Materials	$30,571.01	
Wages	39,147.82	
Subsistence	12,770.07	
		82,488.90
Surveys		647.51
Repairs to plant		8,094.62
Care of plant		1,884.03
New plant		3,309.71
Steamer Newton		1,500.00
Total		100,000.00

In compliance with resolution of the commission adopted April 9, 1906, there should be added to the above total cost for the year $8,828.03, for use and deterioration of plant, being a charge of 3 per cent per annum for use of plant and 4 per cent per annum for deterioration. During the year the total amount charged to the allotment for plant, for care and repair of plant during the lay-off season and at the engineer depot was $24,977.99, of which the pro rata share chargeable to the above work is estimated to be $11,030.28.

NEW ORLEANS HARBOR.

Abstract of appropriations.

Act of Congress.	Allotted.	Amount.
Improving harbor at New Orleans, La.:		
June 18, 1878 (river and harbor)		$50,000.00
Mar. 3, 1879 (sundry civil)		60,000.00
June 16, 1880 (sundry civil)		75,000.00
Mar. 3, 1881 (river and harbor)		75,000.00
Aug. 2, 1882 (river and harbor)	By transfer	162.86
Jan. 19, 1884 (river and harbor)	do	1,400.00
July 5, 1884 (river and harbor)	do	4,900.00
July 13, 1892 (river and harbor)		80,000.00
Aug. 18, 1894 (sundry civil)		110,000.00
June 3, 1896 (river and harbor)	June 27, 1896	110,000.00
March 3, 1899 (sundry civil)	Mar. 13, 1899	110,000.00
Received from sale of property		38.63
		676,501.49
Improving Mississippi River, New Orleans Harbor:		
Aug. 5, 1886 (river and harbor)		75,000.00
Aug. 11, 1888 (river and harbor)		* 199,888.00
Sept. 19, 1890 (river and harbor)	Oct. 15, 1890	90,000.00
Do	Dec. 4, 1890	10,000.00
Do	By transfer	8,000.00

* Original appropriation, $200,000; $112 reserved by the Chief of Engineers for office expenses.

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Abstract of appropriations—Continued.

Act of Congress.	Allotted.	Amount.
Improving Mississippi River, New Orleans Harbor—Continued.		
June 4, 1897 (river and harbor)	By transfer..	$10,000.00
Do	....do.....	40,000.00
June 13, 1902 (river and harbor)	July 12, 1902	95,000.00
Mar. 3, 1905 (sundry civil)	Apr. 26, 1905	85,000.00
June 30, 1906 (sundry civil)	June 28, 1906	10,000.00
Mar. 2, 1907 (river and harbor)	July 12, 1907	100,000.00
May 27, 1908 (sundry civil)	May 4, 1908	150,000.00
Received from sales, blueprints	.....	1.75
Mar. 4, 1909 (sundry civil)	Apr. 28, 1909	100,000.00
		972,889.75
Grand total	.....	1,649,391.34

6. PLANT.

At date of last annual report the working plant of the district consisted of 65 large pieces. Under project approved May 27, 1909, the construction of the following additional plant was authorized: One steel-hull towboat, two quarter boats, and five standard barges of creosoted lumber. All of this additional plant, except the towboat, has been completed, and the working plant now comprises 72 large pieces, exclusive of docks, lighters, pontoons, skiffs, etc. The new plant, except the towboat, has been constructed, and existing plant repaired, cared for, and maintained at the United States engineer depot, at New Orleans, La. Details of operations on the construction of new plant and the repairs and care of that on hand are as follows:

Construction.—Proposals were asked, bids opened, and contract for the construction of the new steel-hull towboat *Plaquemine* awarded to Mr. Ed. J. Howard, of Jeffersonville, Ind. Slow progress has been made, and the boat has not been completed and delivered in the time stated in the contract. It is probable, however, that the boat will be completed and delivered before June 30, 1910. The construction of the two new quarter boats, *St. Joseph* and *Baton Rouge*, was undertaken by hired labor. Operations were commenced August 3, 1909, and they were completed on January 22, 1910, at a cost of $10,060 each. Construction of the five standard barges of creosoted lumber, *Nos. 49, 50, 51, 52,* and *53*, was also undertaken by hired labor. Operations were commenced June 25, 1909, and the last of the five barges was completed on January 4, 1910, at a cost of $4,405 each. In addition to the foregoing the organized force at the engineer depot has constructed the following plant for other engineer districts: For works in charge of Lieut. Col. Lansing H. Beach, four barges of creosoted lumber. For works in charge of Capt. H. B. Ferguson, four barges of creosoted lumber. The construction of a pile-driver hull and three more barges for works in charge of Lieutenant-Colonel Beach has been undertaken and operations are now in progress.

Repairs.—Repairs to the plant of the district have been made at the engineer depot, details being as follows:

Designation.	Cost.	Work done.
Steamer Gen. John Newton..	$7,522.31	New lower portion of Hopkins boiler. New end on main shaft. New cylinder head, plummer blocks, journals, and cams. New outboard cylinder beams. General repairs to make good wear and tear of operation.
Steamer Tensas	525.38	General repairs to make good wear and tear of operation.
Tug Morganza	1,183.02	New cap, angle irons, and braces for bulwarks. General repairs to make good wear and tear of operation.
Tug Tunica	1,844.74	New wheel, new boiler-feed pump. Entire set new tubes in boiler. General repairs to make good wear and tear of operation.
Tug Marengo	2,262.55	New rail cap and chocks. New iron bitts. New low-pressure piston. General repairs to make good wear and tear of operation.
Tug Manchac	216.16	General repairs to make good wear and tear of operation.
Dredge The Ram	7,088.12	New priming valve in discharge pipe. New sheer legs for cutter head and discharge pipe. New propelling wheel. New centrifugal pump complete. General repairs to make good wear and tear of operation.

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Designation.	Cost.	Work done.
Grader No. 1 (formerly No. 5).	$1,047.53	General repairs to make good wear and tear of operation.
Lovee machine Barataria	4,268.73	New tubes and water column in boiler. New track and rack. New winch engine. New capstan. General repairs to make good wear and tear of operation.
Launch Beatrice	127.85	General repairs to make good wear and tear of operation.
Quarterboats:		
New Orleans	170.57	General minor current repairs to make good wear and tear of operation.
Natchez	322.20	
Lake Borgne	34.40	
Alpha	403.67	
Beta	317.78	
Gamma	299.93	
Delta	213.24	
Barges:		
No. 2	14.73	General repairs to make good wear and tear of operation.
No. 3	103.05	
No. 5	3.50	
No. 6	22.00	
No. 8	3.20	
No. 11	33.97	
No. 15	23.48	
No. 16	22.50	
No. 17	10.00	
No. 20	1.60	
No. 21	65.08	
No. 22	13.40	
No. 23	50.96	
No. 25	61.66	
No. 27	91.59	
No. 29	10.00	
No. 33	6.80	
No. 34	51.11	
No. 35	80.45	
No. 40	141.92	
No. 41	10.40	
No. 44	118.63	
No. 46	181.33	
No. 51	1.60	
No. 1	240.19	Docked. On account of accidents, repairs to bottoms, sides, and rakes were necessary to replace broken gunwales, planks, etc. Hulls recalked.
No. 4	340.08	
No. 7	405.05	
No. 13	424.84	
No. 18	443.91	
No. 19	340.39	
No. 24	227.70	
No. 28	370.60	
No. 30	576.00	
No. 31	271.19	
No. 32	344.84	
No. 36	378.75	
No. 37	248.42	
No. 39	273.56	
No. 14	914.66	Docked. Well put in, hull fitted with spuds and reinforced to take boiler and machinery of new hydraulic grader.
No. 26	347.40	Camel dock under each end. Rakes, sides, and head blocks recalked. Deck sheathing renewed.
No. 38	231.09	
Sectional dock	1,233.16	Sections placed in dock and generally overhauled and repaired. Recalked and painted.
Camel dock	193.45	Docked, overhauled, and repaired. Recalked.
Stern dock	133.60	Docked, overhauled, and molded to take Tunics.
Lighters and pontons	175.57	Two lighters docked, overhauled, and calked.
Skiffs	387.07	Eight skiffs built. Ten repaired.
Reels and stands	26.68	Eighteen reels and stands for wire cables made.
Box pumps, capstan bars, stages, coal boxes, mattress jacks, etc.	231.14	Twenty-two box pumps made and 18 repaired. Seventy capstan bars and 6 coal boxes made. Twelve mattress jacks repaired.
	37,730.48	

Care of plant.—In addition to the foregoing, the cost of caring for the plant while not in use, including such items as watching at night, putting out and taking in mooring lines, operating pump boat, salaries of one boat's crew, general supervision, etc., amounted to $7,500.

Condition of plant.—The general condition of the plant is good. The hulls of quarter boats and barges built of noncreosoted lumber have continued to deteriorate, and the quarter boats *Alpha*, *Beta*, *Gamma*, *Delta*, and barges *Nos. 4, 15, 16, 17, 18, 28, 30, 31, and 32* are in bad condition.

Superintendent R. H. Bolen was in charge at the engineer depot of the construction, repair, and care of plant, under the general direction of Assistant Engineer H. S. Douglas.

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PLANT, FOURTH DISTRICT.

The amount expended from June 30, 1909, to June 30, 1910, is $95,176.57, distributed as follows:

Office expenses (main office)		$2,187.50
Other administrative expenses		954.57
Repairs (hired labor):		
Materials	$7,854.60	
Wages	6,749.39	
Subsistence	325.70	
		14,929.69
Care of plant		4,367.81
New plant		1,384.87
Steamer *Newton*		1,153.55
		24,977.99
New plant, construction of barges, etc		70,198.58
Total		95,176.57

PLANT.

Abstract of appropriations.

Act of Congress.	Allotted.	Amount.
Aug. 18, 1894 (sundry civil)	Sept. 8, 1894	$10,000.00
June 4, 1897 (sundry civil)	Aug. 20, 1897	20,000.00
Transferred from Quartermaster's Department, authority Secretary of War	Sept. 21, 1898	8,000.00
July 1, 1898 (sundry civil)	Mar. 13, 1899	5,556.00
Mar. 3, 1899 (sundry civil)	....do....	64,444.00
June 6, 1900 (sundry civil)	July 20, 1900	25,000.00
June 13, 1902 (river and harbor)	July 12, 1902	111,000.00
Proceeds of sale of engineer property	.....	540.81
Mar. 3, 1903 (sundry civil)	Apr. 16, 1903	22,000.00
Do	July 21, 1903	25,000.00
Proceeds of sale of engineer property	.....	5,351.74
Do	.....	1,018.80
Received for injuries to barge	.....	18.00
Apr. 28, 1904 (sundry civil)	Apr. 1, 1904	38,000.00
Mar. 3, 1905 (sundry civil)	Apr. 26, 1905	45,000.00
June 30, 1906 (sundry civil)	June 28, 1906	55,000.00
Mar. 2, 1907 (river and harbor)	Apr. 6, 1907	65,000.00
Proceeds of sale of engineer property	.....	570.95
Received from sale of blueprint	.....	.25
May 27, 1908 (sundry civil)	May 4, 1908	55,000.00
Do	By transfer	1,500.00
Mar. 4, 1909 (sundry civil)	Apr. 28, 1909	106,000.00
Proceeds of sale of engineer property	.....	258.50
Transferred from improvement Bayou Vermilion and Mermentau River, Louisiana, "For Mermentau River"	.....	29.41
Repair of damages to plant	.....	5.25
Total	.....	664,293.71

7. SURVEYS, GAUGES, AND OBSERVATIONS.

The annual surveys called for by resolutions of the Mississippi River Commission were made at Bondurant Chute, Kempé Bend, Giles Bend, Natchez Front, Old River, Simmesport sill dams, and in New Orleans Harbor at Greenville Bend, Gretna Bend, Gouldsboro Bend, Algiers Point, and third district reach. In addition to these, surveys were made at Marengo Bend, showing location of gabion, at Plaquemine Bend, and in New Orleans Harbor from Fourth to Eighth streets. Of these surveys only those in New Orleans Harbor and Plaquemine Bend were charged to the regular allotment for surveys, the cost of the others being charged to the works in progress.

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The amount expended from June 30, 1909, to June 30, 1910, is $3,005.35, distributed as follows:

Office expenses (main office)		$64.35
Other administrative expenses		506.67
Field work and drafting:		
Materials	$119.98	
Wages	1,356.83	
Subsistence	795.66	
		2,272.47
Repairs to plant		35.70
Care of plant		7.60
New plant		81.06
Steamer *Newton*		37.50
Total		3,005.35

In compliance with resolution of the commission adopted April 9, 1906, there should be added to the above total cost for the year $229.85 for use and deterioration of plant, being a charge of 3 per cent per annum for use of plant and 4 per cent per annum for deterioration.

Abstract of appropriations.

Act of Congress.	Allotted.	Amount.
"Survey, unleveed front, fourth district," Aug. 2, 1882 (river and harbor)		$1,000.00
"Survey Cubbitts, Gap and vicinity," Aug. 2, 1882 (river and harbor)		[a] 137.14
"Observations at Carrollton, La.:"		
Aug. 2, 1882 (river and harbor)		3,000.00
Mar. 3, 1883 (river and harbor)		1,500.00
Total		4,500.00
"Discharge observations," Aug. 11, 1888 (river and harbor)	Oct. 3, 1888	9,000.00
"Gauges," Aug. 11, 1888 (river and harbor)	do	2,000.00
"Surveys, examinations, and contingencies:"		
Aug. 11, 1888 (river and harbor)	Dec. 20, 1888	1,000.00
Do	Mar. 20, 1890	3,000.00
Total		4,000.00
"Surveys, gauges, and observations:"		
Sept. 19, 1890 (river and harbor)	Dec. 4, 1890	12,000.00
Do	By transfer	1,000.00
July 13, 1892 (river and harbor)	Aug. 10, 1892	12,000.00
Mar. 3, 1893 (sundry civil)	May 18, 1893	12,000.00
Aug. 18, 1894 (sundry civil)	Sept. 8, 1894	12,000.00
Mar. 2, 1895 (sundry civil)	Apr. —, 1895	10,000.00
June 3, 1896 (river and harbor)	Aug. 25, 1897	500.00
Mar. 3, 1899 (sundry civil)	Mar. 13, 1899	5,000.00
June 6, 1900 (sundry civil)	May 27, 1899	5,000.00
Do	Nov. 28, 1900	1,000.00
June 13, 1902 (river and harbor)	July 12, 1902	5,000.00
Mar. 3, 1903 (sundry civil)	July 21, 1903	6,000.00
Apr. 28, 1904 (sundry civil)	Apr. 1, 1904	5,000.00
Mar. 3, 1905 (sundry civil)	Apr. 26, 1905	5,000.00
June 30, 1906 (sundry civil)	June 28, 1906	5,000.00
Mar. 2, 1907 (river and harbor)	July 12, 1907	5,000.00
May 27, 1908 (sundry civil)	May 4, 1908	5,000.00
Received from sales, blueprints		8.28
Mar. 4, 1909 (sundry civil)	Apr. 28, 1909	3,000.00
Received from sales, blueprints		3.10
Total		104,511.38
Grand total		130,148.52

[a] Original allotment, $300; $162.86 transferred to New Orleans Harbor.

8. LEVEES.

For work of levee construction and maintenance, the fourth district, improving Mississippi River, is subdivided into seven levee districts. For limits of the districts, see current report of the Mississippi River Commission and the plates published in last annual report.

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On July 1, 1909, the amount of levee work required to complete the contracts then in force was 825,553 cubic yards at an average cost of 24.26 cents per cubic yard.

Under project approved May 27, 1909, for the expenditure of the allotments from the sundry civil act approved March 4, 1909, together with the balances of former allotments, contracts were entered into during the year for 529,922.95 cubic yards of levee work at an average cost of 25.31 cents per cubic yard.

Construction.—During the past year construction forces were employed almost continuously in one or more of the districts.

No muck or base ditches were cut during the past season, as all old embankments enlarged were known to be free from leaks and the foundations of all new levees were free from objectionable matter.

Following the custom of previous years, the tabular statements as to levee construction are for the period from May 1, 1909, to May 1, 1910. During this period the total amount of levee work completed and paid for by the United States was 1,465,837.21 cubic yards. The tables of completed and uncompleted levees herewith show the number of cubic yards constructed under each contract, unit prices, and percentage in place.

Tables follow, stating the percentage in length of existing levee system built wholly or in part by the United States, with the proportion of the levees now built in each district, and the approximate condition of the levee line in the fourth district as to grade.

LOWER TENSAS LEVEE DISTRICT.

[Completed levees.]

Name of levee.	Miles below Cairo.	Date of completion.	Length of levee.	Average height above ground surface.*	New or enlargement.	Total cubic yards.	Price per cubic yard.	Total cost.
			Feet.	*Feet.*			*Cents.*	
Hulse, secs. 1-6..	623 R.	Mar. 30, 1910	5,684	18.6	Enlargement.	82,731.29	23.40	$19,359.12
Hewitt, secs. 1-6.	623.5 R.	Apr. 8, 1910	4,900	18.9	.....do.....	75,567.72	23.40	17,692.83
Limerick, secs. 1, 2, 5, 6.	624 R.	Mar. 30, 1910	4,100	15.8	.....do.....	51,019.88	23.40	11,938.65
Aurora, secs. 1, 2, 3, 6.	624.5 R.	July 24, 1909	4,100	16.2	.....do.....	51,403.09	23.40	12,028.32
Burn, secs. 4, 5, 6.	625 R.	Nov. 10, 1909	2,800	16.3	.....do.....	34,680.61	23.40	8,115.27
Hard Times:								
Lot 1, secs. 1-6.	638 R.	Feb. 7, 1910	1,300	18.7	New.....	74,275.80	16.00	11,884.14
Lot 2, sec. 1....	638 R.	May 10, 1909	400	18.7	.....do.....	14,200.80	16.00	2,286.53
Lot 4, secs. 1-3.	638 R.	Jan. 30, 1910	500	22.8	.....do.....	32,463.89	16.00	5,194.22
Horner, secs. 1, 2, 4-6.	638 R.	Sept. 6, 1909	1,033	21.5	.....do.....	58,684.59	24.70	14,495.09
Greens:								
Lot 1, secs. 7-8.	723 R.	Apr. 19, 1910	400	20.4	.....do.....	22,570.04	31.40	7,086.99
Lot 2, sec. 2....	723 R.	Apr. 7, 1910	200	20.2	.....do.....	10,896.97	31.50	3,432.54
Lot 3, secs. 5, 6.	723 R.	Apr. 28, 1910	400	18.9	.....do.....	19,351.58	27.98	5,414.57
Ashley, secs. 5, 6.	724 R.	Feb. 15, 1910	3,000	13.5	Enlargement.	25,342.97	20.00	5,068.59
Glasscock, secs. 3, 5, 8.	725 R.	Dec. 3, 1909	2,213	17.2	.....do.....	37,170.48	26.90	9,998.86
Ardee, secs. 1, 2, 3, 6.	726 R.	Jan. 20, 1910	3,600	19.4	.....do.....	51,960.86	21.00	11,911.77
Roseland, secs. 1, 2.	727 R.	Jan. 28, 1910	1,700	15.5	.....do.....	24,798.56	16.95	4,203.35
Bougere:								
Lot 11, sec. 4..	739.5 R.	Oct. 8, 1909	300	19.4	New.....	16,558.08	36.98	6,123.18
Lot 15, sec. 5..	739.5 R.	Nov. 19, 1909	200	22.7	.....do.....	12,525.18	36.98	4,631.81
Lot 16, secs. 2-5.	739.5 R.	Jan. 5, 1910	700	23.6	.....do.....	42,544.13	36.98	15,732.82
Lot 17, secs. 1-5.	739.5 R.	Feb. 1, 1910	800	23.7	.....do.....	50,172.43	36.98	18,553.76
Lot 18, secs. 1-5.	739.5 R.	Feb. 1, 1910	800	23.6	.....do.....	55,594.58	36.98	20,558.88
Lot 19, secs. 1-4.	739.5 R.	Jan. 14, 1910	600	24.1	.....do.....	48,592.87	36.98	17,969.63
Lot 20, secs. 1-5 e.	739.5 R.	Jan. 11, 1910	800	23.4	.....do.....	59,067.15	36.98	21,843.03
Lot 12, secs. 1-6, 8.	739.5 R.	Nov. 15, 1909	1,300	23.5	.....do.....	96,937.84	36.50	35,382.32
Lot 13, secs. 6-8 b.	739.5 R.	Dec. 9, 1909	700	21.8	.....do.....	63,178.02	36.50	23,059.98
Lot 14, secs. 1-4, 8.	740 R.	Dec. 8, 1909	1,100	20.4	.....do.....	63,556.63	36.50	23,198.17
Lot 3, secs. 1-3.	740 R.	Oct. 7, 1909	900	20.4	.....do.....	49,947.22	33⅓	16,649.07

* Part of levee to be cut out and rebuilt. b Including slough cut out and refilled.

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LOWER TENSAS LEVEE DISTRICT—Continued.

[Uncompleted levees.]

Name of levee.	Miles below Cairo.	Date of contract.	Length of levee.	Average height above ground surface.	New or enlargement.	Total cubic yards.	Price per cubic yard.	Percentage in place.
Greens:			*Feet.*	*Feet.*			*Cents.*	
Lot 1, secs. 1–6	723 R.	July 21, 1909	1,400	20.4	New	74,338.38	31.40	24
Lot 2, secs. 1, 3–8	723 R.	July 19, 1909	1,900	20.2	do	98,297.25	31.50	47
Lot 3, secs. 1–4, 7–9	723 R.	Sept. 15, 1909	1,800	18.9	do	82,071.87	27.98	29

BARATARIA LEVEE DISTRICT.

[Completed levees.]

Name of levee.	Miles below Cairo.	Date of completion.	Length of levee.	Average height above ground surface.	New or enlargement.	Total cubic yards.	Price per cubic yard.	Total cost.
			Feet.	*Feet.*			*Cents.*	
Point Celeste	1,008 R.	Feb. 3, 1910	1,722 N. 1,820 E. 3,542	9.0	New and enlargement.	25,503.85	14.17	$3,589.15
Riosland	1,015 R.	Dec. 11, 1909	2,737	11.0	New	43,546.00	13.55	5,901.57
Cognevich	1,026 R.	Nov. 22, 1909	1,720	7.5	Enlargement	6,431.97	19.40	1,247.80

PONTCHARTRAIN LEVEE DISTRICT.

[Completed levees.]

Revenue:								
Sec. 1	874 L.	June 30, 1909	344	18.6	New	12,493.21	18.49	$2,309.99
Sec. 2	874 L.	June 1, 1909	300	18.4	do	12,648.51	18.49	2,338.71
Sec. 9	874 L.	June 23, 1909	369	18.2	do	12,987.74	18.49	2,401.43
Gem:								
Sec. 2	882 L.	Apr. 2, 1910	300	19.0	do	13,892.87	16.99	2,360.40
Sec. 4	882 L.	do	300	19.1	do	14,120.78	16.99	2,399.12
Sec. 5	882 L.	do	300	18.8	do	13,347.40	16.99	2,267.73
Sec. 6	882 L.	Apr. 29, 1910	300	17.5	do	12,190.24	16.99	2,071.12

[Uncompleted levees.]

Name of levee.	Miles below Cairo.	Date of contract.	Length of levee.	Average height above ground surface.	New or enlargement.	Total cubic yards.	Price per cubic yard.	Percentage in place.
Gem:			*Feet.*	*Feet.*			*Cents.*	
Sec. 1	882 L.	Nov. 12, 1909	334	19.2	New	13,661.49	16.99	50
Sec. 3	882 L.	do	300	18.4	do	13,312.12	16.99	55
Sec. 7	882 L.	do	300	17.5	do	11,837.59	16.99	70
Sec. 8	882 L.	do	300	17.3	do	11,581.49	16.99	7
Sec. 9	882 L.	do	300	17.5	do	11,765.31	16.99	(a)
Sec. 10	882 L.	do	395	17.5	do	14,268.01	16.99	(a)
Bolsblanc, sec. 1–4	950 L.	Dec. 27, 1909	2,173	13.8	do	54,178.03	14.90	15

a No work done.

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LAKE BORGNE LEVEE DISTRICT.

[Completed levees.]

Name of levee.	Miles below Cairo.	Date of completion.	Length of levee.	Average height above ground surface.	New or enlargement.	Total cubic yards.	Price per cubic yard.	Total cost.
			Feet.	*Feet.*			*Cents.*	
Point Pleasant	1,029 L.	May 7, 1909	8,845	7.5	Enlargement	34,183.00	14.19	$4,850.54
Lower Point Pleasant	1,032 L.	Apr. 23, 1910	8,943	7.5	.....do.....	38,609.38	10.30	3,975.81

Percentage of length of existing levee system built wholly or in part by the United States.

Name of district.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.
	P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
Lower Tensas	71	71	72	73	73	63	64	64.5	64.7	67.6	66.7
Atchafalaya	68	69	68	67.9	68	66.5	66.7	64.7	63.7	63.4	62.8
Lafourche	75	82	83	78	77.7	77.6	77.6	77	77	72.7	72.7
Barataria	63	55	55	55	55	56.5	55.2	62.6	61.6	57.2	55.5
Pontchartrain	80	78	78	79	80	86.9	88.2	88.7	88.8	86.1	84.6
Lake Borgne	44.5	46	46	46	44.5	49.7	48.6	54	54.3	53.8	55.5
Whole fourth district, improving Mississippi River	67.2	68.7	69	68.6	66.3	66.5	66.8	70.8	69.2	68.2	67.6

Condition of levees and levee work for period from May 1, 1909, to May 1, 1910.

Levee district.	In system.	Built.	Contents in 1909.	Built since by United States.	Built since by local authorities.	Constructed in 1910.
	Miles.	*Miles.*	*Cubic yards.*	*Cubic yards.*	*Cubic yards.*	*Cubic yards.*
Lower Tensas	160.59	153.64	22,801,733	1,264,603	211,500	1,476,103
Atchafalaya	127.19	127.19	22,064,286	.....	238,713	238,713
Lafourche	82.02	82.02	9,656,072	.....	20,597	20,597
Barataria	71.88	71.88	3,569,497	75,482	154,667	230,149
Pontchartrain	125.77	125.77	18,423,891	116,302	447,099	563,401
Lake Borgne	78.25	78.25	4,137,420	72,792	96,823	169,615
Total	645.70	638.75	80,652,899	1,529,179	1,169,399	2,698,578

Levee district.	Lost during year.	Contents in 1910.	Required to complete.	Estimated final contents.	Percentage now built.	Including in final contents for banquettes.
	Cu. yds.	*Cubic yards.*	*Cubic yards.*	*Cubic yards.*	*Per cent.*	*Cu. yds.*
Lower Tensas	311,100	[a]23,966,736	6,310,601	30,277,337	79.1	2,897,800
Atchafalaya	129,100	22,173,899	3,462,500	25,636,399	86.5	2,720,400
Lafourche	18,700	9,657,969	1,734,397	11,392,366	84.8	1,335,765
Barataria	100,081	3,699,565	674,096	4,373,661	84.6	35,994
Pontchartrain	333,084	[b]18,654,208	3,060,726	21,714,934	85.9	2,201,547
Lake Borgne	55,124	4,251,911	1,098,122	5,350,033	79.5	106,278
Total	947,189	82,404,288	16,340,442	98,744,730	83.5	9,297,784

[a] This amount includes 191,539 cubic yards placed on the new Hard Times levee previous to May 1, 1909, but not included in last year's report on account of levee not being completed and old levee being the controlling line; and 52,819 cubic yards placed on the new Greens levee not included in this amount on account of levee not being completed and old levee being controlling line.

[b] This amount includes 78,173 cubic yards placed on the new Revenue levee previous to May 1, 1909, but not included in last year's report on account of levee not being completed and old levee being the controlling line; 53,551 cubic yards placed on the new Gem levee not included in this amount on account of levee not being completed and old levee being the controlling line.

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Condition of levees in fourth district as to grade.

District.	Above highest water.					Up to grade but deficient in section.	Up to grade and of required section.	Total length.
	Less than 1 foot.	1 foot to 2 feet.	2 to 3 feet.	3 to 4 feet.	4 to 5 feet.			
	Miles.	*Miles.*	*Miles.*	*Miles.*	*Miles.*	*Miles.*	*Miles.*	*Miles.*
Lower Tensas [a]	.....	.....	3.98	55.15	17.80	18.12	58.69	153.64
Atchafalaya	.....	.....	.63	6.68	.....	.....	119.88	127.19
Lafourche [b]	.....	1.24	5.27	4.17	.....	5.06	66.28	82.02
Barataria [c]	3.84	18.15	14.80	11.82	.....	5.00	18.27	71.88
Pontchartrain [d]	.....	.41	2.28	4.04	.....	19.42	99.62	125.77
Lake Borgne [e]	2.29	16.59	23.90	10.31	.....	6.90	18.26	78.25
Total	6.13	36.39	50.76	92.17	17.80	54.50	381.00	638.75

[a] The grade in this district varies from 5 to 6.2 feet above highest water.
[b] The grade in this district varies from 2.9 to 4.2 feet above highest water. The length given from 3 to 4 feet is below grade.
[c] Refers to high water of 1907.
[d] The grade varies from 3.4 to 4.6 feet above highest water. Length given as 3 to 4 feet is below grade.

Protection against high water.—Up to date of this report the water has not reached a sufficient elevation to necessitate any protection work.

Repairs.—In the Pontchartrain levee district two sloughs in the Bourbon levee (910–L) were cut out and the excavated material replaced with surface soil. This work was done by hired teams and laborers, at a cost of $2,479.97.

Revetment.—A concrete revetment was placed on Riceland levee (1015–R) for a length of 2,347 feet, at a cost of $7,299.10, and a wooden revetment for a length of 390 feet, at a cost of $307.17. A wooden revetment was also placed on Point Celeste levee (1008–R) for a length of 3,550 feet, at a cost of $3,224.73.

Levee building machine.—The levee machine was used in Old River from August 17 to September 18 in connection with dredging clay lumps which could not be removed by *The Ram*. From October 1 to April 1 it was continuously employed in the construction of Riceland (1015–R), Point Celeste (1007–R), and Lower Point Pleasant (1032–L) levees. Repairs and betterments to the extent of $3,919.33 were made during the past year. These consisted principally of the following items: Purchase and installation of a steam capstan for the barge, repairs and renewals for bucket, renewal of two lower circular rails, additional antifriction roller of an improved type, repairs to the boiler and enlargement of the upper frame to give more coal space and better distribution of weight on the rollers.

The levee outfit at this date represents an outlay of $29,817.31, which amount includes the original cost of the machine, quarterboat, and barge, also all money expended for equipment, repairs, and renewals.

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Abandoned levees.—The following table gives the history of each levee abandoned by the construction of new levees from May 1, 1909, to May 1, 1910:

Name.	Miles below Cairo.	District.	Length.	By whom built.	When built.	By whom last enlarged.	When last enlarged.
			Feet.				
Hard Times-Horner.	632-R.	Lower Tensas.	3,784	United States.	1882-5	United States.	1904
			3,984	....do.....	1882-5	State.....	1907
Sycamore.....	693-R.	....do.....	4,547	State.....	1881	....do.....	1903
			500	....do.....	1903		
Highland.....	816-R.	Atchafalaya...	1,414	United States.	1891	United States.	1898
			769	State.....	1899		
Soniat.....	869-R.	....do.....	1,992	....do.....	1884	State.....	1899
			391	United States.	1894	....do.....	1899
Harvey.....	961-R.	Lafourche.....	931	State.....	1892	....do.....	1898
Gretna Box.....	962-R.	....do.....	612	....do.....	1897	....do.....	1904
Belle Chasse.....	985-R.	Barataria.....	3,184	Not known.....	.....	United States.	1896
Concord to Oak Point.	998-R.	....do.....	228	State.....	1908		
			2,635	Not known.....	.....	United States.	1903
			100	State.....	1908		
Point Celeste.....	1,008-R.	....do.....	1,794	Not known.....	.....	United States.	1896
Riceland.....	1,015-R.	....do.....	202	United States.	1907		
			2,502	Not known.....	.....	United States.	1896
St. Patrick Church	1,021-R.	....do.....	500	....do.....	.....	State.....	1909
Felix Hingle.....	1,028-R.	....do.....	500	State.....	1904		
Bullot.....	1,030-R.	....do.....	500	....do.....	1897		
Lee Rice to Clinton.	1,032-R.	....do.....	105	....do.....	1909		
			603	Not known.....	.....		
			564	....do.....	.....	State.....	1896
Clinton.....	1,032-R.	....do.....	294	....do.....	.....	....do.....	1896
Ophelia.....	867 L.	Pontchartrain.	348	United States.	1904		
			255	....do.....	1894	United States.	1899
			539	....do.....	1893	....do.....	1905
Revenue.....	874 L.	....do.....	2,227	....do.....	1892	....do.....	1905
			251	....do.....	1908		
Southwood.....	875 L.	....do.....	553	....do.....	1908		
			3,465	....do.....	1890	United States.	1905
Darrow.....	889 L.	....do.....	990	....do.....	1895	....do.....	1904
			300	State.....	1903		
Hermitage.....	890 L.	....do.....	40	....do.....	1903		
			1,835	....do.....	1879	State.....	1903
Albert Spies.....	950 L.	....do.....	2,771	....do.....	1882	....do.....	1904
Southport.....	957 L.	....do.....	1,636	....do.....	1884	....do.....	1901
Poydras.....	978 L.	Lake Borgne..	1,262	United States.	1895	United States.	1899
Stella.....	986 L.	....do.....	710	....do.....	(a)	....do.....	1900
Belair.....	995 L.	....do.....	327	State.....	1905		
Waltzer.....	1,019 L.	....do.....	1,780	....do.....	1900	State.....	1906

[a] Not known.

Supervision.—All levee work in the fourth district is under the supervision of Assistant Engineer W. E. Knobloch, assisted by Junior Engineers W. C. Barton and John Klorer.

The detailed expenditures during the fiscal year and the abstract of allotments for each levee district follow.

LOWER TENSAS LEVEE DISTRICT.

The amount expended from June 30, 1909, to June 30, 1910, is $413,233.03, distributed as follows:

Office expenses (main office)	$10,622.50
Other administrative expenses	8,622.20
Construction of levees (contract)	387,757.23
Surveys	586.56
Repairs to levees	30.00
Steamer *Newton*	5,574.54
Total	413,233.03

In compliance with resolution of the commission adopted April 9, 1906, there should be added to the above total cost for the year $416.90, for use and deterioration of plant, being a charge of 3 per cent per annum for use of plant and 4 per cent per annum for deterioration. During the year the total amount charged to the allotment for plant, for care and repair of plant during the lay-off season and at the engineer depot was $24,977.99, of which the pro rata share chargeable to the above work is estimated to be $249.78.

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Abstract of appropriations.

Act of Congress.	Allotted.	Amount.
"Levees, Tensas front:"		
Aug. 2, 1882, (river and harbor)		$436,160.00
Jan. 19, 1884 (river and harbor)		21,000.00
Do	By transfer..	3,000.00
July 5, 1884 (river and harbor)		99,000.00
Do		8,710.00
Do	By transfer..	3,400.00
Do	June 16, 1886	1,000.00
Aug. 5, 1886 (river and harbor)	Nov. 20, 1886	11,100.00
Do	July 7, 1887	15,000.00
Do	Aug. —, 1887	150,000.00
Aug. 11, 1888 (river and harbor)	Oct. 3, 1888	[a] 160,000.00
Total		899,370.00
"Protection of levees, Tensas front:"		
Aug. 5, 1886 (river and harbor)	Mar. 4, 1887	7,000.00
Do	Aug. —, 1887	6,000.00
Aug. 11, 1888 (river and harbor)	Oct. 3, 1888	10,000.00
Total		23,000.00
"Levees, Tensas basin:"		
Sept. 19, 1890 (river and harbor)	Dec. 4, 1890	199,500.00
Do	By transfer..	36,475.00
Do		11,542.50
Do	By transfer..	1,334.75
Do	...do.....	3,000.00
Aug. 5, 1886 (river and harbor)	Reallotted from sales.	21.00
Total		253,873.25
"Protection of levees, Tensas basin:"		
Sept. 19, 1890 (river and harbor)		9,525.00
Do	By transfer..	607.50
Do	.....do.....	70.25
Do	.....do.....	5,000.00
Do	.....do.....	5,000.00
Total		20,202.75
"Protection of levees, fourth district:"		
Aug. 11, 1888 (river and harbor)		29,211.94
"Lower Tensas levee district:"		
July 13, 1892 (river and harbor)	Aug. 10, 1892	150,000.00
Mar. 3, 1893 (sundry civil)	May 18, 1893	132,000.00
Aug. 18, 1894 (sundry civil)		[b] 67,000.00
Mar. 2, 1895 (sundry civil)		[c] 89,360.00
June 3, 1896 (river and harbor)	June, 1896	45,000.00
June 4, 1897 (sundry civil)	Aug. 20, 1897	228,700.00
July 19, 1897 (deficiency)	July 19, 1897	45,000.00
July 1, 1898 (sundry civil)	Mar. 10, 1898	120,000.00
Do	June 29, 1898	30,000.00
Do	Jan. 17, 1899	3,000.00
Do	Jan. 24, 1899	5,000.00
Mar. 3, 1899 (sundry civil)	Mar. 13, 1899	217,300.00
June 6, 1900 (sundry civil)	July 20, 1900	110,000.00
June 13, 1902 (river and harbor)	July 12, 1902	110,000.00
Mar. 3, 1903 (sundry civil)	Nov. 25, 1903	110,000.00
Apr. 28, 1904 (sundry civil)	June 25, 1903	110,000.00
Mar. 3, 1905 (sundry civil)	Apr. 26, 1905	110,000.00
Mar. 3, 1905 (river and harbor)	July 29, 1905	85,000.00
Do	By transfer	18,932.86
June 30, 1906 (sundry civil)	June 28, 1906	225,000.00
Mar. 2, 1907 (river and harbor)	Mar. 27, 1907	300,000.00
May 2, 1908 (sundry civil)	May 4, 1908	100,000.00
Received from sales, blueprints		.50
Mar. 4, 1909 (sundry civil)	Apr. 28, 1909	100,000.00
Received from sales, blueprints		.25
Total		2,521,293.61
Grand total		3,736,951.55

[a] Original allotment, $175,000; $5,000 transferred to protection of third district; $10,000 to protection fourth district.
[b] Original allotment, $132,000; $65,000 transferred to Middle Tensas district.
[c] Original allotment, $132,000; $40,000 transferred to Middle Tensas district and $2,640 to Homochitto district.

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ATCHAFALAYA LEVEE DISTRICT.

The amount expended from June 30, 1909, to June 30, 1910, is $3,957, distributed as follows:

Office expenses (main office)	$3.00
Other administrative expenses	13.00
Construction of levees (contract)	3,937.95
New plant	3.05
Total	3,957.00

In compliance with resolution of the commission adopted April 9, 1906, there should be added to the above total cost for the year $416.89 for use and deterioration of plant, being a charge of 3 per cent per annum for use of plant and 4 per cent per annum for deterioration. During the year the total amount charged to the allotment for plant, for care and repair of plant during the lay-off season, and at the engineer depot was $24,977.99, of which the pro rata share chargeable to the above work is estimated to be $249.78.

Abstract of appropriations.

Act of Congress.	Allotted.	Amount.
"Atchafalaya front:"		
Aug. 2, 1882 (river and harbor)		$110,000.00
Jan. 19, 1884 (river and harbor)		5,000.00
Do		4,000.00
Do		15,000.00
Do		[a] 2,800.00
Aug. 3, 1886 (river and harbor)		40,000.00
Total		176,800.00
"Levees right bank below Red River:"		
Sept. 19, 1890 (river and harbor)	Dec. 4, 1890	123,975.00
Do	By transfer	41,562.50
Do	do	12,468.75
Do	do	1,441.15
Total		179,447.40
"Protection of levees, right bank below Red River:"		
Sept. 19, 1890 (river and harbor)		6,222.30
"Protection of levees, fourth district:"		
Aug. 11, 1888 (river and harbor)		23,663.00
"Atchafalaya levee district:"		
July 13, 1892 (river and harbor)	Aug. 10, 1892	155,000.00
Mar. 3, 1893 (sundry civil)	May 18, 1893	152,000.00
Aug. 18, 1894 (sundry civil)		[b] 147,366.96
Mar. 2, 1895 (sundry civil)		[c] 148,960.00
June 3, 1896 (river and harbor)	June —, 1896	28,125.00
June 4, 1897 (sundry civil)	Aug. 20, 1897	138,600.00
July 19, 1897 (deficiency)	July 19, 1897	28,125.00
July 1, 1898 (sundry civil)	Mar. 10, 1898	70,000.00
Do	June 29, 1898	17,000.00
Mar. 3, 1899 (sundry civil)	Mar. 13, 1899	98,800.00
June 6, 1900 (sundry civil)	July 20, 1900	55,000.00
June 13, 1902 (river and harbor)	July 12, 1902	40,000.00
Mar. 3, 1903 (sundry civil)	Nov. 25, 1903	40,000.00
Apr. 28, 1904 (sundry civil)	July 21, 1903	40,000.00
Mar. 3, 1905 (sundry civil)	July 29, 1905	40,000.00
Mar. 3, 1905 (river and harbor)	Apr. 26, 1905	30,000.00
June 30, 1906 (sundry civil)	June 28, 1906	25,000.00
Mar. 2, 1907 (river and harbor)	Mar. 27, 1907	30,000.00
Total		1,283,976.96
Grand total		1,670,109.66

[a] Original allotment, $12,000; $9,200 transferred to Tensas Front, New Orleans Harbor, and mouth of Red River.
[b] Original allotment, $152,000; $4,633.04 transferred to Pontchartrain levee district.
[c] Original allotment, $152,000; $3,040 transferred to Homochitto levee district.

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LAFOURCHE LEVEE DISTRICT.

Abstract of appropriations.

Act of Congress.	Allotted.	Amount.
"Protection of levees, right bank below Red River:"		
Sept. 19, 1890 (rivers and harbors)		$6,222.30
"Protection of levees, fourth district:"		
Aug. 11, 1888 (river and harbors)		32,536.62
"Lafourche levee district:"		
July 13, 1892 (rivers and harbors)	Aug. 10, 1892	90,000.00
Mar. 3, 1893 (sundry civil)	May 18, 1893	90,000.00
Aug. 18, 1894 (sundry civil)		90,000.00
Mar. 2, 1895 (sundry civil)		[a] 88,200.00
June 3, 1896 (rivers and harbors)	June —, 1896	8,437.50
June 4, 1897 (sundry civil)	Aug. 20, 1897	41,600.00
July 19, 1897 (deficiency)	July 19, 1897	8,437.50
July 1 1898 (sundry civil)	Mar. 10, 1898	24,000.00
Do	June 29, 1898	12,000.00
Mar. 3, 1899 (sundry civil)	Mar. 13, 1899	37,050.00
June 6, 1900 (sundry civil)	July 20, 1900	28,000.00
June 13, 1902 (rivers and harbors)	July 12, 1902	20,000.00
Mar. 3, 1903 (sundry civil)	Nov. 25, 1903	20,000.00
Apr. 28, 1904 (sundry civil)	July 21, 1903	40,000.00
Mar. 3, 1905 (rivers and harbors)	Apr. 26, 1905	15,000.00
Mar. 3, 1905 (sundry civil)	July 29, 1905	[b] 21,067.14
Total		633,782.14
Grand total		672,551.06

[a] Original allotment, $90,000; $1,800 transferred to Homochitto levee district.
[b] Original allotment, $40,000; $18,932.86 transferred to Lower Tensas levee district.

BARATARIA LEVEE DISTRICT.

The amount expended from June 30, 1909, to June 30, 1910, is $25,271.03, distributed as follows:

Office expenses (main office)	$625.00
Other administrative expenses	1,471.66
Construction of levees	10,617.44
Surveys	16.10
Repairs to plant	782.05
New plant	114.78
Care of plant	249.50
Repairs to levees	188.50
Revetment of levees	10,831.00
Steamer Newton	375.00
Total	25,271.03

In compliance with resolution of the commission adopted April 9, 1906, there should be added to the above total cost for the year $1,176.32, for use and deterioration of plant, being a charge of 3 per cent per annum for use of plant and 4 per cent per annum for deterioration. During the year the total amount charged to the allotment for plant, for care and repair of plant during the lay-off season and at the engineer depot, was $24,977.99, of which the pro rata share chargeable to the above work is estimated to be $124.89.

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Abstract of appropriations.

Act of Congress.	Allotted.	Amount.
"Protection of levees, fourth district:"		
August 11, 1888 (river and harbor)		$2,947.87
"Barataria levee district."		
July 13, 1892 (river and harbor)	Aug. 10, 1892	60,000.00
Mar. 3, 1893 (sundry civil)	May 18, 1893	60,000.00
Aug. 18, 1894 (sundry civil)		60,000.00
Mar. 2, 1895 (sundry civil)		*58,800.00
June 3, 1896 (river and harbor)	July 19, 1897	3,937.50
June 4, 1897 (sundry civil)	Aug. 20, 1897	19,400.00
July 19, 1897 (deficiency)	July 19, 1877	3,937.50
July 1, 1898 (sundry civil)	Mar. 10, 1898	15,000.09
Do	June 29, 1898	12,000.00
Mar. 3, 1899 (sundry civil)	Mar. 13, 1899	24,700.09
June 6, 1900 (sundry civil)	July 20, 1900	14,000.09
June 13, 1902 (river and harbor)	July 12, 1902	10,000.00
Mar. 3, 1903 (sundry civil)	Nov. 25, 1903	10,000.00
Apr. 28, 1904 (sundry civil)	June 25, 1903	15,000.00
Mar. 3, 1905 (sundry civil)	Apr. 26, 1905	15,000.00
Mar. 3, 1905 (river and harbor)	July 29, 1905	15,000.00
June 30, 1906 (sundry civil)	June 28, 1906	10,000.00
Mar. 2, 1907 (river and harbor)	Mar. 27, 1907	25,000.00
May 27, 1908 (sundry civil)	May 4, 1908	40,000.00
Total		471,775.09
Grand total		474,722.87

* Original allotment, $60,000; $1,200 transferred to Homochitto levee district.

PONTCHARTRAIN LEVEE DISTRICT.

The amount expended from June 30, 1909, to June 30, 1910, is $32,353.56, distributed as follows:

Office expenses (main office)	$1,125.00
Other administrative expenses	1,800.16
Construction of levees (contract)	26,029.24
Surveys	26.40
Repairs to plant	33.10
New plant	4.44
Care of plant	180.25
Repairs to levees	2,479.97
Steamer *Newton*	675.00
Total	32,353.56

In compliance with resolution of the commission adopted April, 1906, there should be added to the above total cost for the year $416.89, for use and deterioration of plant, being a charge of 3 per cent per annum for use of plant and 4 per cent per annum for deterioration. During the year the total amount charged to the allotment for plant, for care and repair of plant during the lay-off season and at the engineer depot, was $24,077.99, of which the pro rata share chargeable to the above work is estimated to be $249.78.

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Abstract of appropriations.

Act of Congress.	Allotted.	Amount.
"Bonnet Carre Crevasse:"		
Aug. 2, 1882 (river and harbor)		$15,000.00
"Levees left bank below Red River:"		
Sept. 19, 1890 (river and harbor)	Dec. 4, 1890	89,775.00
Do		21,850.00
Do		6,750.70
Do		780.90
		119,156.60
"Protection of levees, left bank below Red River:"		
Sept. 19, 1890 (river and harbor)		6,563.00
Do	By transfer	355.30
Do	do	41.10
Do	do	3,000.00
		9,959.40
"Protection of levees, fourth district:"		
Aug. 11, 1888 (river and harbor)		15,630.57
"Pontchartrain levee district:"		
July 13, 1892 (river and harbor)	Aug. 10, 1892	150,000.00
Mar. 3, 1893 (sundry civil)	May 18, 1893	150,000.00
Aug. 18, 1894 (sundry civil)		150,000.00
Do	By transfer	4,633.04
Mar. 2, 1895 (sundry civil)		[a] 147,000.00
June 3, 1896 (river and harbor)	June , 1896	22,500.00
June 4, 1897 (sundry civil)	Aug. 20, 1897	113,150.00
July 19, 1897 (deficiency)	July 19, 1897	22,500.00
July 1, 1898 (sundry civil)	Mar. 10, 1898	60,000.00
Do	June 29, 1899	16,000.00
Mar. 3, 1899 (sundry civil)	Mar. 13, 1899	74,100.00
June 6, 1900 (sundry civil)	July 20, 1900	50,000.00
June 13, 1902 (river and harbor)	July 12, 1902	101,500.00
Mar. 3, 1903 (sundry civil)	Nov. 25, 1903	81,500.00
Apr. 28, 1904 (sundry civil)	June 25, 1903	90,000.00
Mar. 3, 1905 (sundry civil)	Apr. 26, 1905	90,000.00
Mar. 3, 1905 (river and harbor)	July 29, 1905	60,000.00
June 30, 1906 (sundry civil)	June 28, 1906	35,000.00
Mar. 2, 1907 (river and harbor)	Mar. 27, 1907	120,000.00
May 27, 1908 (sundry civil)	May 4, 1908	75,000.00
Received from sales, blueprints		.25
Mar. 4, 1909 (sundry civil)	Apr. 28, 1909	40,000.00
		1,652,883.29
Grand total		1,812,629.86

[a] Original allotment, $150,000; $3,000 transferred to Atchafalaya levee district.

LAKE BORGNE LEVEE DISTRICT.

The amount expended from June 30, 1909, to June 30, 1910, is $8,101.19, distributed as follows:

Office expenses (main office)	$250.00
Other administrative expenses	632.13
Construction of levees	4,623.88
Surveys	33.25
Repairs to plant	2,373.79
New plant	37.15
Care of plant	.99
Steamer *Newton*	150.00
Total	8,101.19

In compliance with resolution of the commission adopted April 9, 1906, there should be added to the above total cost for the year $576.35, for use and deterioration of plant, being a charge of 3 per cent per annum for use of plant and 4 per cent per annum for deterioration. During the year the total amount charged to the allotment for plant, for care and repair of plant during the lay-off season and at the engineer depot, was $24,977.99, of which the pro rata share chargeable to the above work is estimated to be $124.89.

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Abstract of appropriations.

Act of Congress.	Allotted.	Amount.
July 13, 1892 (river and harbor)	Aug. 10, 1892	$50,000.00
Mar. 3, 1893 (sundry civil)	May 18, 1893	50,000.00
Aug. 18, 1894 (sundry civil)		50,000.00
Mar. 2, 1895 (sundry civil)		[a] 49,000.00
June 3, 1896 (river and harbor)	June , 1896	4,500.00
June 4, 1897 (sundry civil)	Aug. 20, 1897	22,200.00
July 19, 1897 (deficiency)	July 19, 1897	4,500.00
July 1, 1898 (sundry civil)	Mar. 10, 1898	16,000.00
Do	June 29, 1898	8,000.00
Mar. 3, 1899 (sundry civil)	Mar. 13, 1899	24,700.00
June 6, 1900 (sundry civil)	July 20, 1900	14,500.00
June 13, 1902 (sundry civil)	July 12, 1902	10,000.00
Do	Mar. 4, 1903	2,000.00
Mar. 3, 1903 (sundry civil)	Nov. 25, 1903	10,000.00
Apr. 28, 1904 (sundry civil)	June 25, 1903	15,000.00
Mar. 3, 1905 (sundry civil)	Apr. 26, 1905	15,000.00
Mar. 3, 1905 (river and harbor)	July 29, 1905	15,000.00
June 30, 1906 (sundry civil)	June 28, 1906	10,000.00
Mar. 2, 1907 (river and harbor)	Mar. 27, 1907	25,000.00
May 27, 1908 (sundry civil)	May 4, 1908	40,000.00
Mar. 4, 1909 (sundry civil)	Apr. 28, 1909	6,000.00
Total		441,400.00

[a] Original allotment $50,000; $1,000 transferred to Homochitto levee district.

Money statements.

BONDURANT.

July 1, 1909, balance unexpended		$5,000.00
June 30, 1910, amount expended during fiscal year:		
For works of improvement	$3,495.20	
For maintenance of improvement	504.80	
		4,000.00
July 1, 1910, balance unexpended		1,000.00
Amount (estimated) required for completion of existing project		[a] Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1912:		
For works of improvement	$4,000.00	
For maintenance of improvement	1,000.00	
		[a] 5,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

KEMPE BEND REVETMENT.

July 1, 1909, balance unexpended		$25,000.00
Amount allotted from sundry civil act approved March 4, 1909		40,000.00
Amount allotted from sundry civil act approved June 25, 1910		90,000.00
		155,000.00
June 30, 1910, amount expended during fiscal year:		
For works of improvement	$48,173.17	
For maintenance of improvement	15,529.84	
		63,703.01
July 1, 1910, balance unexpended		91,296.99
July 1, 1910, outstanding liabilities		7,566.76
July 1, 1910, balance available		83,730.23

[a] Exclusive of the balance unexpended July 1, 1910.

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Amount (estimated) required for completion of existing project	* Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1912:	
For works of improvement $100,000.00	
For maintenance of improvement 65,000.00	
	*$165,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

NATCHEZ AND VIDALIA HARBORS.

July 1, 1909, balance unexpended	$50,000.00
Amount allotted from sundry civil act approved June 25, 1910	44,000.00
Amount allotted from river and harbor act approved June 25, 1910	130,000.00
	224,000.00
June 30, 1910, amount expended during fiscal year:	
For works of improvement $44,746.84	
For maintenance of improvement 5,253.16	
	50,000.00
July 1, 1910, balance unexpended	174,000.00
July 1, 1910, outstanding liabilities	1,583.21
July 1, 1910, balance available	172,416.79
Amount (estimated) required for completion of existing project	* Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1912:	
For works of improvement $125,000.00	
For maintenance of improvement 25,000.00	
	*150,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

ATCHAFALAYA AND RED RIVERS, LOUISIANA.

July 1, 1909, balance unexpended	$25,566.14
Amount allotted from sundry civil act approved June 25, 1910	25,000.00
	50,566.14
June 30, 1910, amount expended during fiscal year for maintenance of improvement	15,507.82
July 1, 1910, balance unexpended	35,058.32
July 1, 1910, outstanding liabilities	206.48
July 1, 1910, balance available	34,851.84
Amount (estimated) required for completion of existing project	* Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1912, for maintenance of improvement	*25,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

* Exclusive of the balance unexpended July 1, 1910.

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HARBOR AT NEW ORLEANS, LA.

July 1, 1909, balance unexpended		$100,000.00
Amount allotted from river and harbor act, approved June 25, 1910		175,000.00
		275,000.00
June 30, 1910, amount expended during fiscal year for works of improvement		100,000.00
July 1, 1910, balance unexpended		175,000.00
July 1, 1910, outstanding liabilities		2,239.74
July 1, 1910, balance available		172,760.26
Amount (estimated) required for completion of existing project		[a] Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1912:		
For works of improvement	$150,000.00	
For maintenance of improvement	25,000.00	
		[a] 175,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and section 7 of the river and harbor act of 1899.		

PLANT, FOURTH DISTRICT.

July 1, 1909, balance unexpended		$106,000.00
Amount allotted from sundry civil act approved June 25, 1910		100,000.00
Amount allotted from river and harbor act approved June 25, 1910		122,000.00
Sale of condemned property		258.50
Transfer settlement		29.41
Repair, damages to plant		5.25
		328,293.16
June 30, 1910, amount expended during fiscal year:		
For works of improvement	$70,198.58	
For maintenance of improvement	24,977.99	
		95,176.57
July 1, 1910, balance unexpended		233,116.59
July 1, 1910, outstanding liabilities		2,274.45
July 1, 1910, balance available		230,842.14
July 1, 1910, amount covered by uncompleted contracts		11,116.59
Amount (estimated) required for completion of existing projects		[a] Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1912:		
For works of improvement	$40,000.00	
For maintenance of improvement	35,000.00	
		[a] 75,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

[a] Exclusive of the balance unexpended July 1, 1910.

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SURVEYS, FOURTH DISTRICT.

July 1, 1909, balance unexpended		$3,000.00
Amount allotted from sundry civil act approved June 25, 1910		5,000.00
Sale of blueprints		5.35
		8,005.35
June 30, 1910, amount expended during fiscal year for maintenance of improvement		3,005.35
July 1, 1910, balance unexpended		5,000.00
July 1, 1910, outstanding liabilities		205.50
July 1, 1910, balance available		4,794.50
Amount (estimated) required for completion of existing project		* Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1912, for maintenance of improvement. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		* 5,000.00

LOWER TENSAS LEVEE DISTRICT.

July 1, 1909, balance unexpended		$481,090.68
Amount allotted from sundry civil act approved June 25, 1910		160,000.00
Amount allotted from river and harbor act approved June 25, 1910		50,000.00
Sale of blueprint		.25
		691,090.93
June 30, 1910, expended during fiscal year:		
For works of improvement	$413,203.03	
For maintenance of improvement	30.00	
		413,233.03
July 1, 1910, balance unexpended		277,857.90
July 1, 1910, outstanding liabilities		968.73
July 1, 1910, balance available		276,889.17
July 1, 1910, amount covered by uncompleted contracts		67,857.90
Amount (estimated) required for completion of existing project		* Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1912:		
For works of improvement	$150,000.00	
For maintenance of improvement	10,000.00	
		* 160,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

ATCHAFALAYA LEVEE DISTRICT.

July 1, 1909, balance unexpended		$3,957.00
Amount allotted from sundry civil act approved June 25, 1910		32,000.00
Amount allotted from the river and harbor act approved June 25, 1910		25,000.00
		60,957.00
June 30, 1910, amount expended during fiscal year for works of improvement		3,957.00
July 1, 1910, balance unexpended		57,000.00
July 1, 1910, outstanding liabilities		204.70
July 1, 1910, balance available		56,795.30

* Exclusive of the balance unexpended July 1, 1910.

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Amount (estimated) required for completion of existing project	[a] Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1912:	
For works of improvement	$40,000.00
For maintenance of improvement	10,000.00
	[a] $50,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

LAFOURCHE LEVEE DISTRICT.

Amount allotted from river and harbor act approved June 25, 1910	$13,000.00
July 1, 1910, balance unexpended	13,000.00
Amount (estimated) required for completion of existing project	[a] Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1912, for maintenance of improvement	[a] 10,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

BARATARIA LEVEE DISTRICT.

July 1, 1909, balance unexpended	$25,271.03
Amount allotted from river and harbor act approved June 25, 1910	25,000.00
	50,271.03
June 30, 1910, amount expended during fiscal year for works of improvement	25,271.03
July 1, 1910, balance unexpended	25,000.00
July 1, 1910, outstanding liabilities	73.47
July 1, 1910, balance available	24,926.53
Amount (estimated) required for completion of existing project	[a] Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1912:	
For works of improvement	$25,000.00
For maintenance of improvement	5,000.00
	[a] 30,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

PONTCHARTRAIN LEVEE DISTRICT.

July 1, 1909, balance unexpended	$48,926.94
Amount allotted from sundry civil act approved June 25, 1910	27,000.00
Amount allotted from river and harbor act approved June 25, 1910	23,000.00
	98,926.94
June 30, 1910, amount expended during fiscal year for works of improvement	32,353.56
July 1, 1910, balance unexpended	66,573.38
July 1, 1910, outstanding liabilities	31.70
July 1, 1910, balance available	66,541.68
July 1, 1910, amount covered by uncompleted contracts	6,724.34

[a] Exclusive of the balance unexpended July 1, 1910.

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Amount (estimated) required for completion of existing project	[a] Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1912:	
For works of improvement $60,000.00	
For maintenance of improvement 10,000.00	
	[a] $70,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

LAKE BORGNE LEVEE DISTRICT.

July 1, 1909, balance unexpended	$11,629.00
Amount allotted from sundry civil act approved June 25, 1910	17,000.00
Amount allotted from river and harbor act approved June 25, 1910	6,000.00
	34,629.00
June 30, 1910, amount expended during fiscal year for works of improvement	8,101.17
July 1, 1910, balance unexpended	26,528.83
July 1, 1910, outstanding liabilities	1,059.97
July 1, 1910, balance available	25,468.86
July 1, 1910, amount covered by uncompleted contracts	2,872.22
Amount (estimated) required for completion of existing project	[a] Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1912:	
For works of improvement $25,000.00	
For maintenance of improvement 5,000.00	
	[a] 30,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of river and harbor act of 1899.	

COMMERCIAL STATISTICS.

By direction of the Commission, the duty of compiling the commercial statistics of the Mississippi River is assigned to the secretary of the Commission. Reference to his report is invited for the statistics of that part of the river included in the fourth district.

The following papers accompany and form part of this report:

Appendix "A."—Abstract of all contracts in force during fiscal year ending June 30, 1910.

Plate I.—Bondurant Chute revetment.
Plate II.—Giles Bend, Natchez and Vidalia harbors.
Plate III (A).—Kempe Bend revetment.
Plate III (B).—Kempe Bend revetment.
Plate IV.—Carrollton Bend, New Orleans Harbor.
Plate V.—Lower Tensas and Homochitto levee districts.
Plate VI.—Atchafalya, Lafourche, and Pontchartrain levee districts.
Plate VII.—Lake Borgne and Barataria levee districts.

Respectfully submitted.

H. BURGESS,
Major, Corps of Engineers, U. S. Army.

Col. WM. H. BIXBY,
Corps of Engineers, U. S. Army,
President Mississippi River Commission.

[a] Exclusive of the balance unexpended July 1, 1910.

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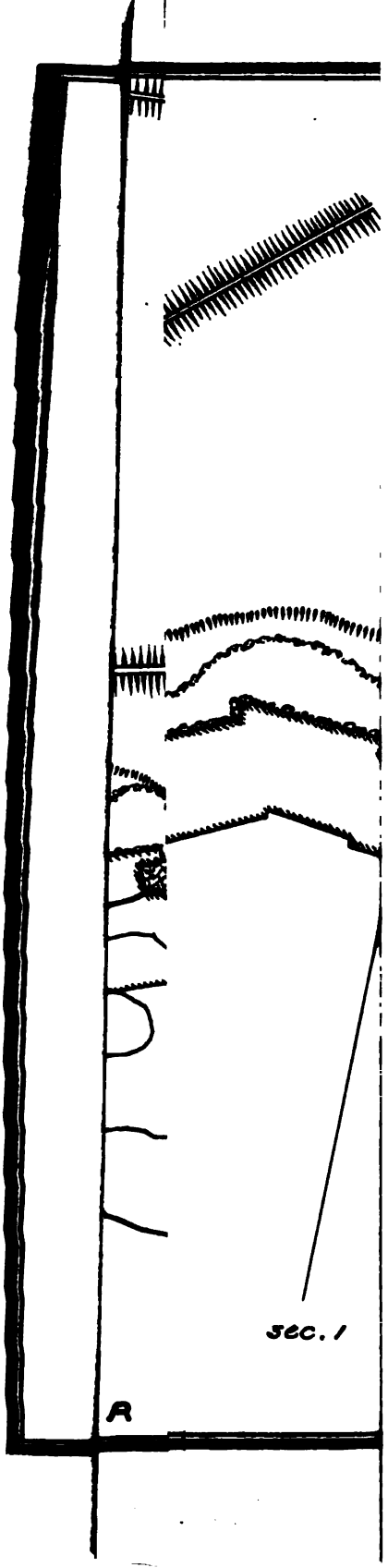

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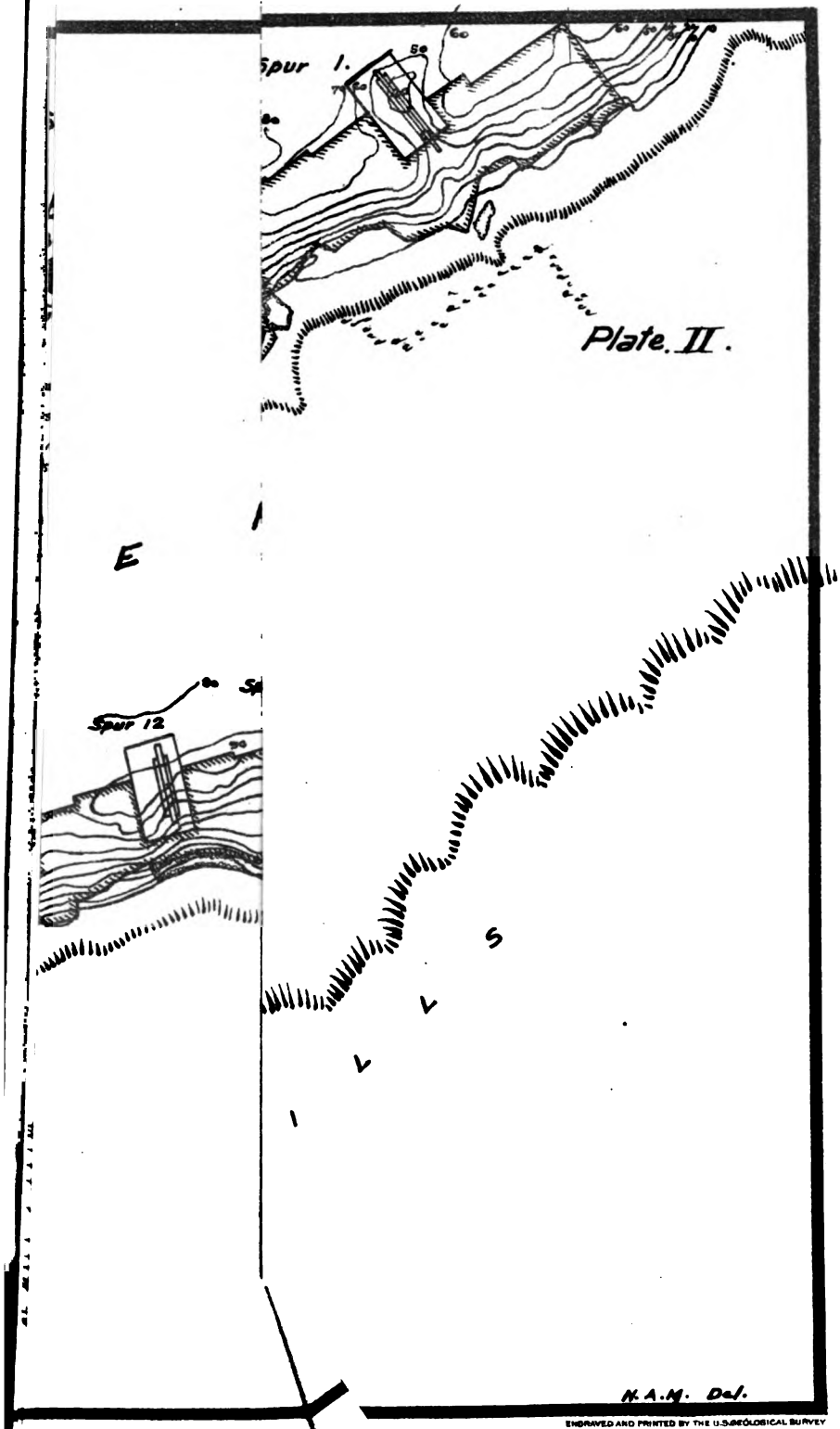

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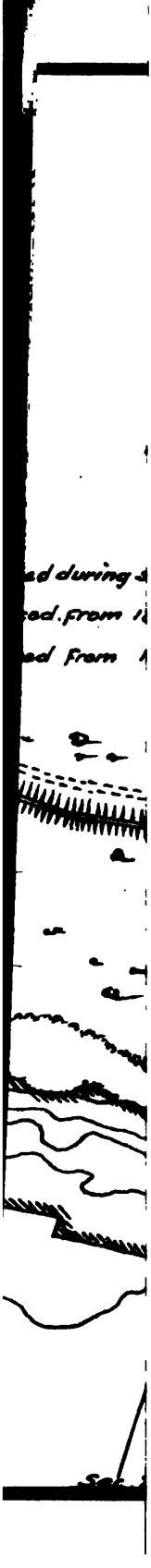

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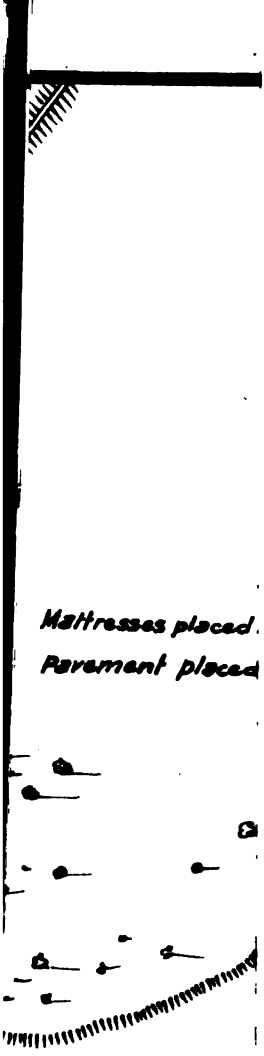

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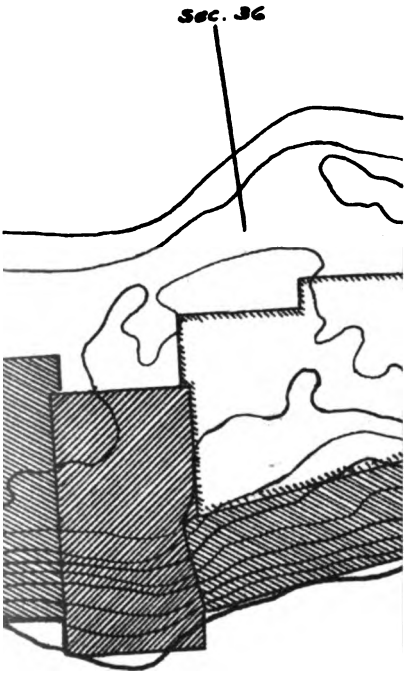

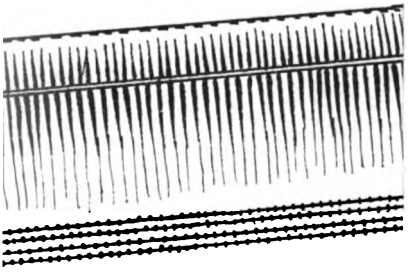

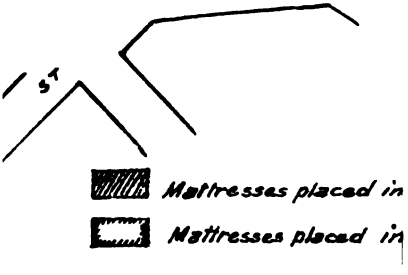

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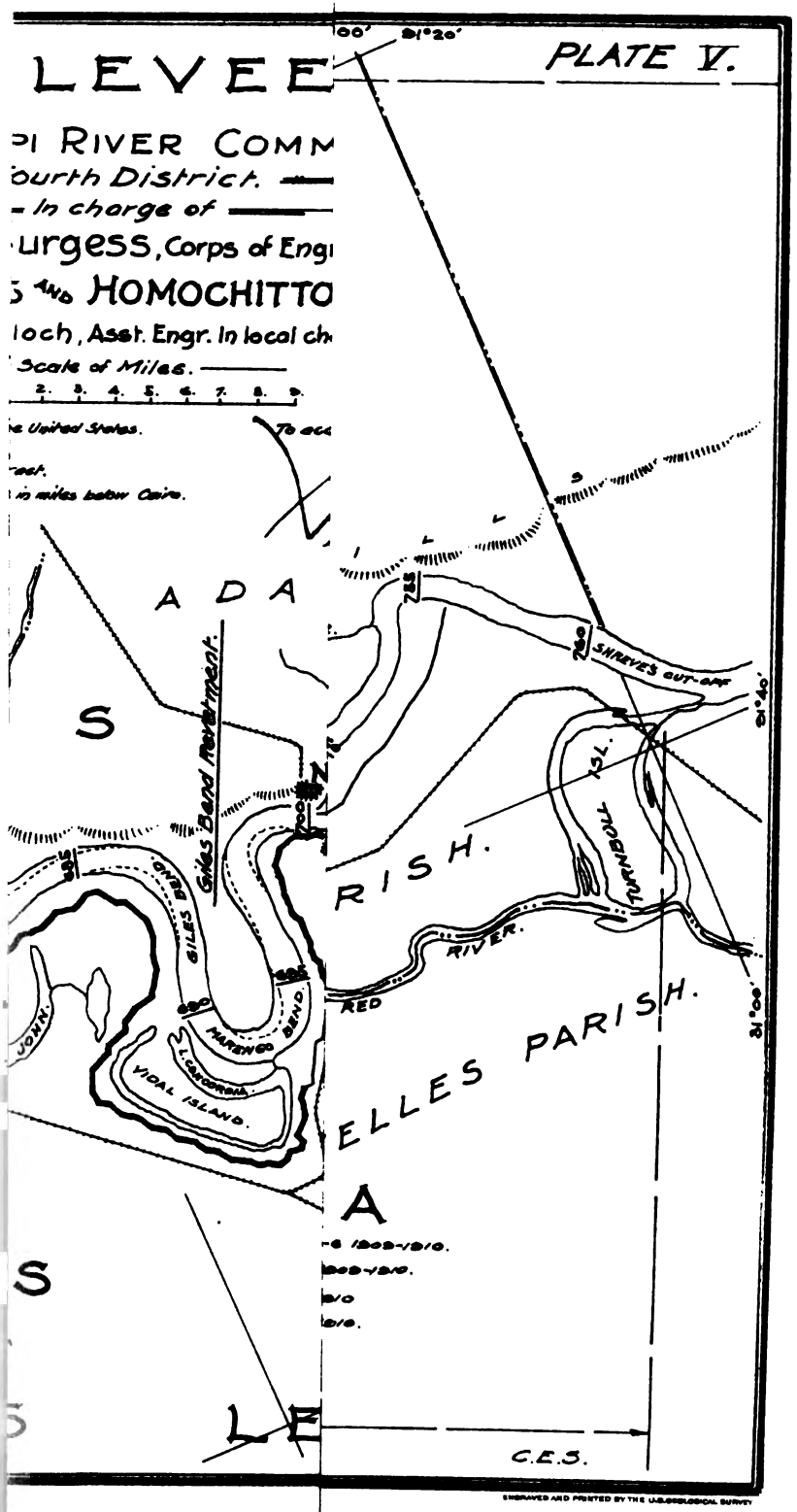

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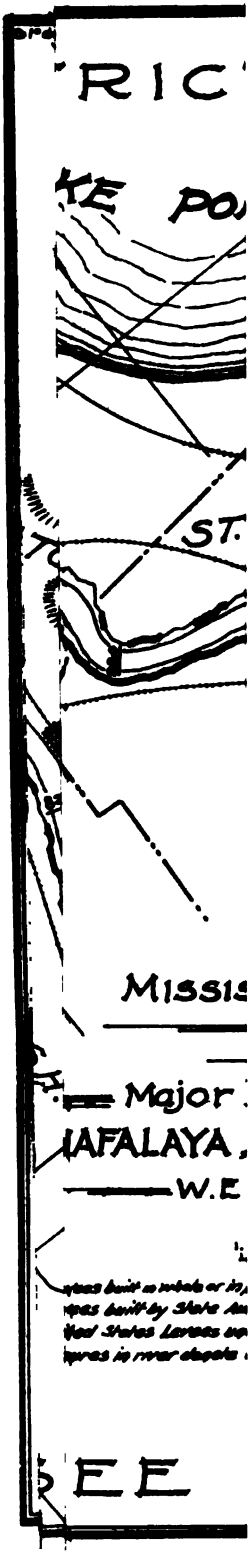

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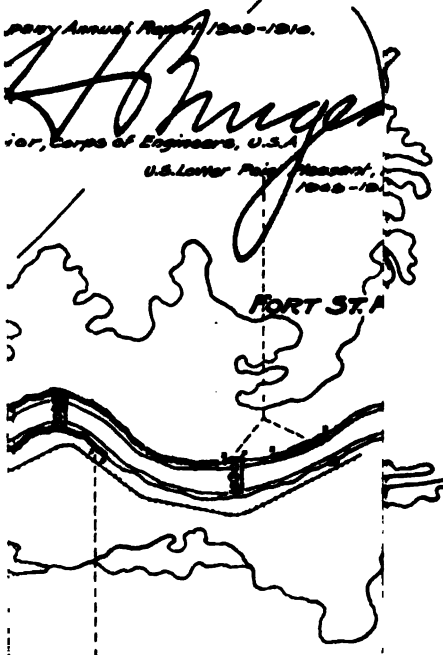
PLATE VII.



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APPENDIX A.—*Abstract of contracts in force during fiscal year ending June 30, 1910.*

FOURTH DISTRICT, IMPROVING MISSISSIPPI RIVER.

Name of contractor.	Amount and character of work.	Unit price.	Date of approval.	Date of beginning of work.	Date of expiration of contract.
Guy Dickinson	7,500 tons rock	$2.25 per ton	July 31, 1909	Oct. 12, 1909	Dec. 1, 1909[a]
Helgason Bros.	244,300 cubic yards levee work	33½ cents	Sept. 13, 1905	Nov. 6, 1905	Feb. 1, 1906[ab]
	120,000 cubic yards levee work	34½ cents			
Donovan & Daley	73,000 cubic yards levee work	24.7 cents	Oct. 28, 1908	Mar. 4, 1909	Aug. 16, 1909[ab]
A. S. Dyar	Rent of office building	$137.50 per month	Lease	Oct. 1, 1908	Oct. 1, 1909[a]
Geo. H. Conrad	7,000 cubic yards levee work	19.4 cents	Oct. 21, 1909	Oct. 5, 1909	Jan. 14, 1910[a]
R. T. Clark & Co	362,000 cubic yards levee work	36.5 cents	Sept. 27, 1906	Aug. 20, 1907	Feb. 1, 1908[ab]
Zeb Ward	7,500 tons rock	$2 per ton	Aug. 13, 1909	Sept. 13, 1909	Dec. 15, 1909[a]
O. A. Gibson	99,300 cubic yards levee work	21 cents	Jan. 15, 1908	Feb. 6, 1908	Jan. 17, 1909[ab]
	96,600 cubic yards levee work	16.95 cents			
	171,500 cubic yards levee work	23 cents			
Helgason Bros.	290,000 cubic yards levee work	16 cents	June 8, 1908	Feb. 28, 1909	Jan. 31, 1910[a]
	98,000 cubic yards levee work	20 cents			
Robt. T. Clark	99,600 cubic yards levee work	26.9 cents	Jan. 23, 1908	Jan. 13, 1908	May 16, 1908[ab]
Harris & Larkin	373,500 cubic yards levee work	23.4 cents	Dec. 8, 1908	Feb. 10, 1909	July 13, 1910[a]
Ed. J. Howard	Towboat Plaquemine	$38,700	July 6, 1909	Aug. 2, 1909	Apr. 28, 1910
Robt. T. Clark	119,000 cubic yards levee work	27.98 cents	Oct. 1, 1909	Mar. 26, 1910	July 31, 1910
A. S. Dyar	Rent of office building	$137.50 per month	Lease	Oct. 1, 1909	Oct. 1, 1910
Donovan & Daley	103,000 cubic yards levee work	31.4 cents	Aug. 20, 1909	Feb. 13, 1910	Nov. 23, 1910
O. A. Gibson	130,000 cubic yards levee work	16.99 cents	Nov. 22, 1909	Feb. 14, 1900	Dec. 31, 1910
Robt. T. Clark	50,000 cubic yards levee work	14.9 cents	Jan. 14, 1910	Apr. 15, 1910	Aug. 5, 1910
Helgason Bros.	118,500 cubic yards levee work	31.5 cents	July 31, 1909	Mar. 6, 1910	Jan. 11, 1911
M. L. Linnan	20,000 cubic yards levee work	19.95 cents	July 5, 1907	June 24, 1907	Mar. 18, 1909[b]
	437,000 cubic yards levee work	36.98 cents			

[a] Contract completed during year.

[b] Time limit waived.

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APPENDIX 5.

TOPICAL INDEX TO THE ANNUAL REPORT OF THE MISSISSIPPI RIVER COMMISSION FOR 1910.

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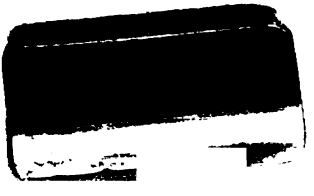

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